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VOLUME 127, No. 10 SEPTEMBER 2, 1948

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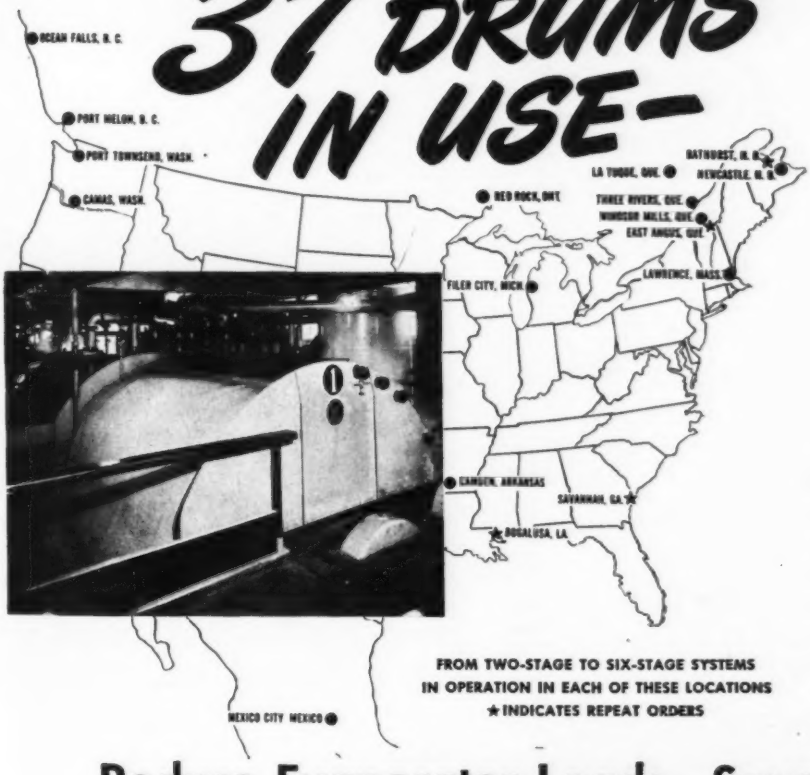

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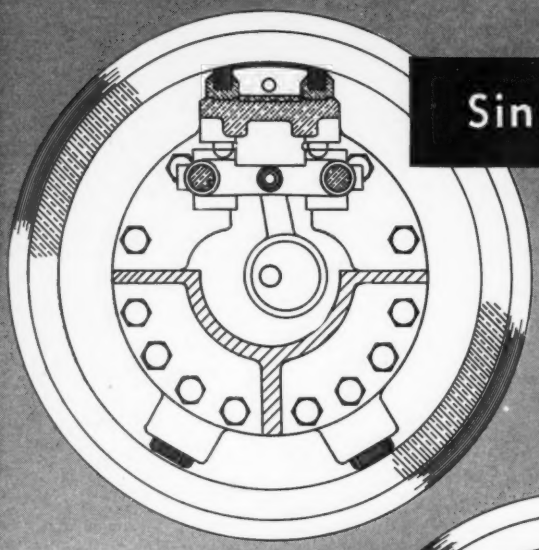

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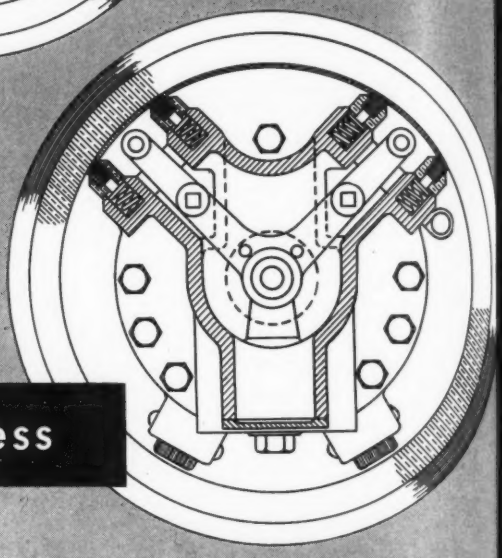

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CALENDAR OF COMING EVENTS

ASSOCIATION EXECUTIVES: Please send us your meeting dates and locations for this column as far in advance as possible. No charge for publication.

SEPTEMBER 8-10: Technical Section, Canadian Association. Hotel Vancouver, Vancouver, B. C., not Harrison Hot Springs, as previously announced.

SEPTEMBER 13-17: Third National Instruments Conference and Exhibit. Convention Hall, Philadelphia.

SEPTEMBER 17: Northeastern Wood Utilization Council. Boston, Mass.

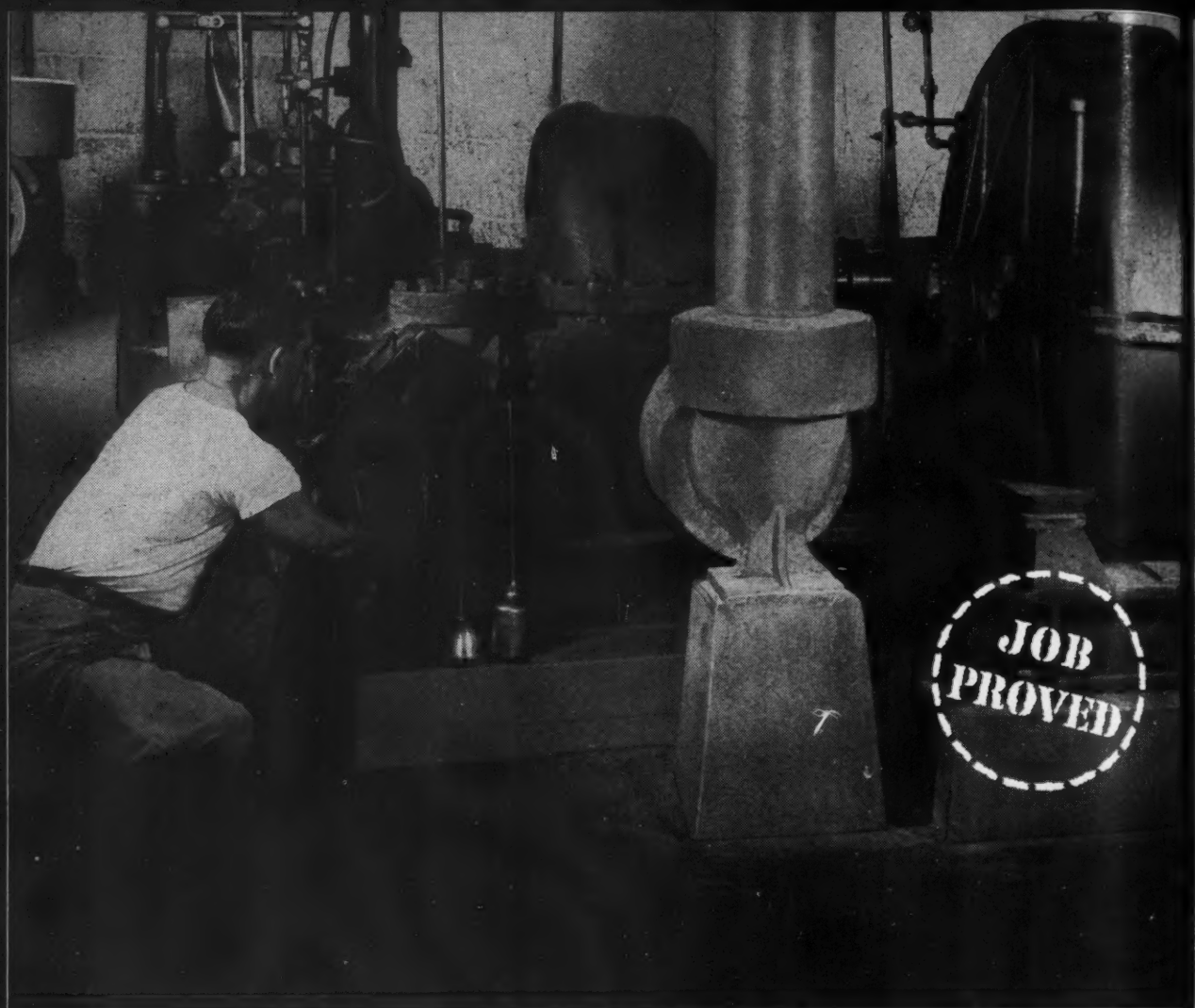
SEPTEMBER 23-25: Northeastern Division Meeting, American Pulp & Paper Mill Superintendents Ass'n. Poland Springs House, Poland Springs, Maine.

SEPTEMBER 27-29: TAPPI Mechanical Pulping Conference (Joint meeting with CPPA Technical Section) Poland Springs House, Poland Springs, Maine.

OCTOBER 11-14: TAPPI Testing Methods Conference at Mellon Institute, Pittsburgh, Pa. Headquarters, William Penn Hotel.

OCTOBER 21-23: Joint Meeting, Southern and Southeastern Superintendents Divisions. Biltmore Hotel, Atlanta, Ga.

OCTOBER 25-28: Third Engineering Conference of the Pulp and Paper Industry sponsored by TAPPI. Statler Hotel and Westinghouse Electric Co., Auditorium, Buffalo, N. Y.



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In October 1945 a paper mill started up a turbine which had been idle during the war. Sunvis 900 Oils were put in the circulating system and the bath-lubricated gear reduction unit. The operating temperature was about 140°F.

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Paper TRADE JOURNAL

VOL. 127, NO. 10 REG. U.S. PAT. OFF. SEPTEMBER 2, 1948

U. S. Stockholm Embassy Sees Pulp Market Shift

WASHINGTON—Warning that later figures on the Swedish pulp export trade may indicate a shift of markets because of cancellations by United States consumers, and notification by Argentina and Brazil that those countries would no longer be able to pay for pulp purchases in dollars, was contained in an American Embassy report from Stockholm released this week.

This has been partly confirmed by latest U. S. import figures showing a drop of 50 percent from the comparable 1947 period, but such indication is not conclusive in the absence of Swedish data showing the subsequent distribution of pulp shipments to foreign markets.

In July, the Embassy reported from Stockholm, it appeared probable that reduction in pulp production during the remainder of 1948 would result from a general easing of the world demand for Swedish pulp at prevailing prices, particularly bleached sulphite and dissolving pulp.

However, exports during the first five months this year, amounting to 817,122 metric tons, represented a gain over the 642,596 tons exported in the corresponding months of 1947. The leading items in each period were unbleached sulphite and bleached sulphite. It was estimated, in the absence of official figures, that customers in the first half of this year were substantially the same as for the corresponding months of 1947, when the United States received an estimated 28 percent of total Swedish pulp shipments.

The Embassy suggestion of a change was in these words: "It is anticipated however, that the July figures will indicate a shift of markets because of cancellations by United States customers and a notification by Argentina and Brazil that those countries would no longer be able to pay for pulp purchases in dollars."

The declining interest in pulp imports from Sweden, in the Brazilian market was indicated in a recent survey by the Department of Commerce, in this connection, which reported that the Brazilian wood pulp industry was becoming more self-sufficient. It was reported that Brazilian production of mechanical pulp was almost equal to requirements, while a new mill in the state of Parana was increasing chemical pulp production. In May 1948, this mill was selling 1,000 tons monthly.

Following difficulties due to a shortage of caustic soda, it was reported that the company was constructing additional facilities to produce caustic soda. Imports in the first quarter of 1948 were reported from Brazil to be still below the estimated 4,000 tons of caustic soda required in that period.

However, in May this year, Brazil was reported to have large inventories of Swedish pulp, and paper mills were refusing to take further deliveries, so that purchases of foreign pulp were falling off.

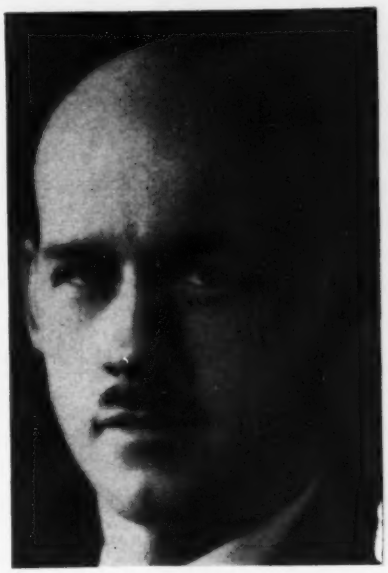
Continuing with the Embassy report from Stockholm, this source said "Reservations for tentative pulp commitments by prospective purchasers were scheduled to be either relinquished or taken up during the first part of July.

"In many cases," said this report, "third-quarter prices were so high that there were many cancellations of the proposed third-quarter shipments. Swedish circles estimated that losses from such cancellations from hard-currency areas, chiefly the United States, would run between $35,000,000 and $50,000,000."

Sweden's pulpwood cut in 1947 totaled 12,600,000 cubic meters. Paper production in the first four months of 1948 totaled 302,965 metric tons, of which newsprint accounted for 95,067 tons and kraft papers for 93,028 tons.

Paperboard production amounted to 57,116 tons. Although the output of paper and paperboard together reached a record of over 1,000,000 tons in 1947, said the Embassy report, it appears unlikely that this year's production will equal that figure. The report added: "The chief reason is that Sweden is encountering increasing resistance to high prices asked in the export market for many types of paper, particularly kraft, all-sulphite grades, and sulphite-groundwood grades, most of which are machine-glazed."

Paper exports were 240,014 tons during the five-month period ended May 1948, compared with 197,223 tons in the corresponding period of 1947. The most important export item in the 1948 period was stated to be 114,938 tons of wrapping paper, and 76,619 tons of newsprint. Kraft paper led wrapping paper exports, with 78,345 tons. Exports of paperboard, including vulcanized fiber, totaled 15,025 tons in the first five months this year, compared with 13,103 tons in the same months a year ago.



DERNELL EVERY

—secretary of the Kraft Paper Ass'n., Inc., and of the Tall Oil Assn., returned with Mrs. Every and the U. S. Olympic Team on the S. S. Washington, on Aug. 27. A member of the U. S. Foil Team, Mr. Every fenced with the team which took fourth place at Wembly . . . Fencing honors have accumulated for Mr. Every since undergraduate days at Yale, where he won the Intercollegiate Foil Championship for 1927 and 1928. He became a member of the U. S. Olympic Fencing Team for 1928 and of each subsequent team (though business required his resignation in 1936), took the National Foil Championship for 1938, 1940 and 1945, and is now president of the Amatuer Fencers' League of America . . . Mrs. Every chaperoned the women members of the team and accompanied her husband on a short visit to Paris and Belgium following the Olympics.

TOP ROW: Left to right—Preston Patterson, Dr. John W. Barron, Edgar Winchester, Donald Rommel, Norman Thompson, Walter Miller, Hugh Gannon and John A. Butterworth. BOTTOM ROW: Left to right—John Birle, Harry Bloom, Charles A. Wilder, Clyde Eagen, Norman W. Fort, Joseph A. Purtell, Richard S. Kelly and John Downes.

Phila. Paper & Cordage Men Golf at Old York Road C. C.

PHILADELPHIA — Joseph A. Purtell, of the Atlantic Paper Co., won the Morgan H. Thomas trophy in the Philadelphia Paper & Cordage Ass'n. third golf tournament at Old York Road Country Club, Jenkintown, Pa., on August 17. Mr. Purtell's 77–13–66 was the low net of the day. Low gross honors, 36–38–74, went to Joseph (Chap) Rafferty, of the Sidco Paper Co. With a handicap of four, Mr. Rafferty was first low net in Class A. John A. Butterworth, of W. C. Hamilton & Sons, led the Class C golfers, shooting the best golf of his career, 102–35–67. Best among the guests was Harrison Todd, stroking 37–41–78.

Thirty-one golfers attended the outing on one of the season's most perfect days. Dinner followed in the clubhouse, where good fellowship prevailed. Howard Satterthwaite, of the Garrett-Buchanan Co., in the absence of chairman Albert Struble, of the D. L. Ward Co., presided at the lively and enjoyable proceedings and awarded prizes to the most capable linksmen. Ed Wallace, of Garrett-Buchanan, was in charge of the tournament and arrangements.

The Association's fourth and next-to-last tournament will be held on September 20 at Llanerch Country Club, Manoa, Pa. An attendance of upwards of 60 is anticipated.

Prize Winners

Low net of the day, Joseph A. Purtell. *Low net—Class A,* Joseph (Chap) Rafferty and Stephen B. DeFarges. *Low net — Class B,* John Birle and Richard S. Kelly. *Low net — Class C,* John A. Butterworth and Max Dee. *Low net guests,* Norman Thompson. *Kickers' handicap,* Joseph Goldstein and Preston Patterson.

New Kraft Use

A new method of prefabricated house construction using an inexpensive but durable combination of kraft paper and wood veneer is described in a report now on sale at $2.25 a copy by the Office of Technical Services, Department of Commerce.

Known as "K-Veneer," the material is made of a single 3/16-inch wood veneer, slit by a unique process, and bonded to .016 to .030 inch kraft paper.

K-Veneer, according to the report, proved to be stiffer, stronger and more puncture-resistant than insulation or gypsum-board, and stiffer and stronger than quarter-inch plywood as normally applied.

Research on K-Veneer was sponsored by the Office of Technical Services with a $37,000 grant as part of a $1,500,000 program to stimulate industrial development during the fiscal year 1946-1947. The Elmendorf Corp. of Chicago signed an "actual cost" contract for the work in December 1946, and completed the research within the following 12 months. Under the contract, the Elmendorf Corp., which retains any patent rights, agrees to license producers for the use of K-Veneer at a reasonable royalty, a portion of which will be used to repay the government for the cost of its support. The licensee will receive technical aid as part of such an arrangement.

The report recommends the use of mineral surfaced felt for external panels. K-Veneer can be manufactured in a continuous machine that slits the veneer, bonds the paper and adds the mineral-surfaced felt.

K-Veneer panels subjected to condensation tests at the Pennsylvania State College showed them sound under extreme contrasts between inside and outside temperatures. Mechanical tests at the U. S. Forest Products Laboratory were considered to have demonstrated satisfactory stiffness for roofing, as well as showing suitable strength for racking of wall panels, and for impact, column compression and concentrated load requirements of partition panels.

Container Plant for Houston

HOUSTON, Texas—The St. Joe Paper Co. of Jacksonville, Fla., on August 21 announced receipt of bids for a $500,000 container plant at Post Oak road and the Hempstead Highway, here. It will provide 100,000 square feet of floor space and will have steel frame, four-foot-high brick walls and steel sash exterior.

Revised Summary of Tariff Information On Papers and Books Issued

WASHINGTON—The United States Tariff Commission has issued this week, its revised Summary of Tariff Information on Papers and Books, also designated as Volume 14. The Summary, 229 pages long, consists of texts and tables on virtually every product of the paper industry, pertaining not only to tariff changes, but also giving information on other phases of each part of the industry covered.

Under the heading "Book and Printing Papers, Not Coated" for example, is a discussion of the shift in United States production by mills making these papers, keeping pace with industry conditions. The summary noted that "The gradual shrinkage of the newsprint industry in the United States since 1926 resulted in the shift of a number of mills from production of newsprint to production of groundwood printing and book papers." After pointing out that this trend continued throughout the war period, though at a declining rate, the summary discloses in 1946-47, when the stringent situation affecting newsprint, both domestic and imported, set in, domestic mills returned to producing newsprint at maximum capacity.

Commenting on changes in the wallboard industry, the summary reports that the large demand for this type of board during and since the war resulted in a rapid increase in output volume, or from about 695 million pounds pre-war to about 1.6 billion pounds in 1946. Additional capacity brought into production since 1946, it was predicted, would show a probable 1.7 billion pounds when 1947 figures are reported.

The volume discloses that the Netherlands has resumed on an expanding scale, the pre-war shipments of strawboard, which came virtually exclusively from that country pre-war, and in 1947, had risen to substantially larger figures, amounting to about 10 percent of domestic production.

A postwar decline in imports of building papers, sheathing felts, etc., due to the increased ability of domestic manufacturers to meet demand, also was noted in the summary.

Another notation concerns the shift in source of imports into the United States of carbon paper since the war, from the United Kingdom as the most important pre-war source, to the addition since the war, of Sweden and Japan as sources of U.S. Imports of this type of paper.

However, in addition to these highlights, the summary contains statistics and comments on all major paper industry products.

Playing Card Tax Grows

WASHINGTON — Internal Revenue collections from the excise tax on playing cards in 1948 increased by $85,274.19 to a total of $7,867,223.97 over collections in the fiscal year 1947, it was reported August 26.

Look Lauds Zellerbach

NEW YORK—James David Zellerbach of the Crown Zellerbach Corp., San Francisco, recently appointed Chief of the Special Mission to Italy for the Economic Co-operation Administration, is featured in "Look Applauds" in the September 14 issue of *Look*, released nationally on August 31.

Accompanying a photograph of Mr. Zellerbach in that issue of *Look* is the following thumbnail sketch:

"James David Zellerbach: Public service rates as high with him as his own private interests. He has kept busy for 34 years making his Crown Zellerbach Corp. one of America's leading paper and pulp companies. But he's always found time to serve his fellow men too. He worked for the International Labor Organization from 1945 to 1948. Recently, he became chief of the Special Mission to Italy for the Economic Co-operation Administration.

"In his own industry, 'J. D.' has won respect as a pioneer in both conservation and labor relations—a subject close to his heart. Management, he believes, should devote as much time to its workers as it does to other phases of its business. His favorite relaxation when he's not off on a mission somewhere: Retiring from his headquarters in San Francisco to his ski lodge in the Sierras —and cooking."

Texon Buys Carew Mill

HOLYOKE, Mass. — The Carew Mfg. Co., of South Hadley Falls, was sold on August 17 to Texon, Inc., of Russell.

The new owners will convert the mill to make Texon impregnated fibre used in the shoe industry. This will remove the Carew from the fine paper industry.

There are two machines of 80 inch width with a trim of 70 inches there.

A new saturator is being installed at once on one of the machines, and a second piece of such equipment will be added to the other machine. The saturator permits the impregnation of the fibre web used for inner soles in shoes with Texon latices. The products is a coating base for imitation leather.

Texon, Inc., was organized last year and its first acquisition was the duPont mill in Russell, formerly the Chapin-Gould Paper Co. That plant was bought Sept. 22, 1947.

David R. Schoales of Blandford is president of the Carew under the new ownership. He is treasurer of Texon, Inc. Other officers are: Morgan J. Vittengl of Westfield, Jay J. Uber of Westfield, and Dennis F. Mulvihill of Russell, vice-presidents; and Earle H. Sylvester of Huntington, clerk and treasurer. Mr. Vittengl is president of Texon.

The Carew mill has besides its two machines, 11 beaters, and its 24-hour production capacity was 24,000 pounds of paper.

Buys "Old Hampshire Bond"

The Byron Weston Paper Co. has bought from the Carew Mfg. Co. the patent rights to 20 watermark and brand names, including "Old Hampshire Bond."

E.C.A. Procurement Authorizations for Pulp and Paper

(as announced to August 16, 1948)

Date publicly announced 1948	Commodity	Authorized to	Country of origin	Value
June 27	Wood pulp	United Kingdom	Canada and Newfoundland	$5,500,000
July 11	Newsprint	Bizone, Germany	Sweden	1,434,000
July 19	Wood pulp	France	Canada	371,000
July 19	Waste paper	France	United States	22,350
July 26	Groundwood pulp	Bizone, Germany	Sweden	888,000
July 26	Groundwood pulp	Bizone, Germany	Finland	488,000
Aug. 2	Waste paper	Bizone, Germany	United States	33,000
Aug. 2	Paper products	Bizone, Germany	Netherlands	300,000
Aug. 9	Electrical pressboard and tympan paper	France	United States	20,000
Aug. 9	Wood pulp	Greece	Sweden	170,000
Aug. 9	Newsprint	Greece	Sweden	210,000
Aug. 12	Mechanical wood pulp	Bizone, Germany	Sweden	339,000
Aug. 12	Rayon grade wood pulp	Bizone, Germany	Sweden	2,210,000
Aug. 16	Bleached cotton linters	Bizone, Germany	United States	128,000
Aug. 16	Bleached cotton linters	Bizone, Germany	United Kingdom	128,000
Aug. 16	Pulpwood	Netherlands	Canada	140,000

National Council for Stream Improvement

Interim Report—Number 10, August 20, 1948

NEW YORK—The National Council for Stream Improvement of the Pulp, Paper and Paper Board Industries, Inc., in an interim report to its membership on August 20 said that after several year's research on pulp and paper industry pollution problems, laboratory developments are to an increasing degree pointing the way to ultimate solution of the problems involved. This necessitates expediting the Council's direct mill service program to the end that technicians, familiar wih procedures developed in the laboratory, can be made available to the mills.

Technically qualified Council employes are already available in most of the regions of the United States and plans are under way whereby additional technicians will be available as requirements for this type of service increase, the report continues.

The conversion of the Council, on a partial basis at least, from a research to a service organization was in the minds of the organizers when plans for the formation of the Council were originally formulated.

National Pollution Control Bill

With its approval by the President on June 30, 1948, the Barkley-Taft Bill (S.418) becomes effective. It will be known as U. S. Public Law No. 845, 80th Congress, Chapter 758—2nd Session.

The bill has been the subject of several National Council releases, the most recent one being Legislative Bulletin No. 25, in which the entire text is given, together with comments on the features important to the pulp and paper industry.

That the bill does not entirely meet with the approval of wild life groups is evident from the tone of an article by Mr. Kenneth A. Reid, Executive Director of the Izaak Walton League of America, entitled "Water Pollution—Sold Down the River" which appears in the appendix of the August 4, 1948, issue of the Congressional Record. The article says in part:

"Many industries have squarely faced their problem and solved it. Others are in the process of doing so. Still others have been stalling these many years. The natural effect on industry will be a cessation of further research, since that responsibility is transferred to government."

The pulp and paper industry is one whose members have "squarely faced their problem" and rather than ceasing or reducing research activities, the National Council's research program is being intensified with notable progress being made on many types of waste.

Connecticut Water Commission

The Connecticut Water Commission is currently considering adoption of standards applicable to pulp and paper mill and other industrial operations. The tentative program envisages classification of Connecticut streams into five classes: Class A, B, C and D with the fixing of standards for each stream based on assumed approval of effluents which would not increase the suspended solids content of a Class B stream by 10 ppm. a Class C stream by 25 ppm, and a Class D stream by 50 ppm.

A meeting of pulp and paper mills to discuss standards has been scheduled by the National Council at Hartford, Connecticut on September 8, 1948.

Ohio River Valley

As has previously been reported the Ohio River Valley Water Sanitation Compact has been approved. Seven states are involved in the Compact. The following Commissioners have been appointed to administer Compact activities:

COMMISSIONERS: Illinois—Charles W. Klassen, chief sanitary engineer; J. J. Woltmann, consulting engineer; Roland R. Cross, M.D., director of health. *Indiana*—L. E. Burney, M.D., director of health; Blucher A. Poole, director, Bureau of Sanitary Engineering; Joseph L. Quinn, engineer. *Kentucky*—Henry Ward, commissioner of conservation; R. B. Fulks, M.D., acting commissioner of health; Earl Wallace, Division of Game and Fish. *New York*—Martin F. Hilfinger, president, Associated Industries of New York State, Inc.; Charles M. McCabe, publisher, *New York Daily Mirror;* Herman E. Hilleboe, M.D., state health commissioner. *Ohio*—Hudson Biery, director of public relations, Cincinnati Street Railway Co.; Kenneth M. Lloyd, executive secretary, Mahoning Valley Industrial Council; John D. Porterfield, M.D., director of health. *Pennsylvania*—Herbert P. Sorg, acting speaker, House of Representatives; E. A. Holbrock, dean, University of Pittsburgh; Norris W. Vaux, M.D., health commissioner. *Virginia*—E. Blackburn, member of Virginia Senate and director, Water Control Board; Ross H. Walker, member, State Water Pollution Control Board; T. Brady Saunders, Member, State Water Pollution Control Board. *West Virginia*—Kenneth S. Watson, chief engineer, State Water Commission; W. W. Jenning, member, State Water Commission; N. H. Dyer, M.D., State Health Commission.

Federal Commissioners

O. Lloyd Moehean, chief, Division of Game, Fish and Hatcheries; Col. Robert G. West, Ohio River Division, U. S. Corps of Engineers; Leonard A. Scheele, M.D., surgeon general, U. S. Public Health Service.

At a meeting in Dayton, Ohio on June 24, under the auspices of the Ohio Department of Health, Dr. Harry W. Gehm presided at an industrial waste forum held for discussing waste disposal problems which might develop from the enactment of the Ohio River Valley Water Sanitation Compact.

Nashua River Program

At a meeting of the Nashua River Committee, a subcommittee of the National Council's New England Regional Committee, held in Fitchburg, Mass., on July 13, rapid progress was reported on the survey of mill losses in the Nashua River watershed. Eighteen mills have been surveyed by Council technicians under Anthony J. Palladino, Council sanitary engineer, and rapid progress is being made in the river survey with "time of passage" studies currently under way.

The Nashua River program is a joint effort of the National Council, the paper mills in the valley and the Massachusetts State Department of Public Health, to ameliorate objectionable conditions resulting from industrial and municipal pollution.

Pilot Plant Operations

Paper industry interest in pilot plant operations in connection with abatement activities is currently running high, with National Council personnel taking an active part in the operation of the plants. The following pilot plant operations are currently under way:

Springhill Mill (Southern Kraft Div., International Paper Co.) A large-scale lime precipitation pilot plant has been in continuous operation at Springhill, Louisiana, using four 10′ x 12′ Dorr clarifiers.

Bergstrom Paper Co. (Neenah, Wis.) has for several months operated a pilot plant at Neenah to study filtration rates through the continuous operation of a 1′ x 1′ vacuum filter. Philip Morgan, council engineer, is assisting in this work which concerns a joint industry

Letters

Dear Mr. Heitzeberg:

I wish to thank you very much for the permission you gave me to copy the enclosed article which appeared in the *Paper Trade Journal* of August 12.

The length of the article lent itself to a good photo-offset display, so we used this method rather than mimeographing.

JOHN B. MacAFEE
Secretary
Forest Products Information Committee
New York 17, N. Y.

and city pollution problem. State and city officials are cooperating in the study.

Warren Glen Mill (Riegel Paper Co.) Council employes are cooperating with Metcalf & Eddy, consulting engineers, and Riegel Paper Co. in the operation of a precipitation, clarification, and sludge dewatering pilot plant at the Warren Glen Mill.

P. H. Glatfelter Co. Vaughn Behn, the Council's Pennsylvania resident sanitary engineer, is assisting in the operation of the P. H. Glatfelter Co. pilot plant for treating mixed book mill wastes. The plant has been in operation for some six months.

Terre Haute Paper Co. Council engineers are assisting in the design and construction of a pilot plant at Terre Haute, Ind., to handle strawboard mill wastes by the high-rate anaerobic decomposition process, a development of the Council's project at Purdue University. This is a large-scale plant with a main digestion tank 10′ x 12′ x 34′.

Michigan Paper Co. of Plainwell, Mich. During 1947, Council personnel operated the pilot plant at the Michigan Paper Co. for treating deinking mill wastes by the aeration process developed by the National Council. Plans are currently under way to construct a full-scale plant, using the process developed by the pilot plant operation, at one of the mills in the Kalamazoo Valley.

National Council Meetings

The following National Council meetings have been held so far this summer: Southern Members' Meeting, Edgewater Park, Miss., April 28; Project Advisory Subcommittee, South Central Region, Lynchburg, Va., June 15; Nashua River Committee, Fitchburg, Mass., July 13; Technical Subcommittee, Southern Region, New Orleans, La., July 23; Pennsylvania Members' Meeting, Philadelphia, July 29.

A meeting of West Coast Members was scheduled for June but floods on the Columbia River forced its last minute postponement.

The following meetings are scheduled for the late summer and fall:

Connecticut Members, Hartford, Conn., Sept. 8; South Central Regional Members, Lynchburg, Va., Sept. 21; West Coast Members, Portland, Ore., date to be set later.

New Members

The Taylor Fibre Co. and the Fairfield Paper Co. have become members of the National Council since the last Interim Report was distributed.

Recent Publications

The following bulletins have been released by the National Council since the last Interim Report was distributed:

General Release—Index of National Council for Stream Imp. Releases—June 2, 1948.

Technical Bulletin No. 16—*Aquatic Biology Research Report.*

Technical Bulletin No. 17 — *Pilot Plant Development Project.*

Technical Bulletin No. 18—*Methods for the Determination of the B.O.D. of Kraft Mill Wastes.*

Technical Bulletin No. 19—*Storage Studies on Kraft Mill Wastes*

Technical Bulletin No. 20—*Summary of Trickling Filter Treatment of Alkaline Pulping Waste Waters.*

Technical Bulletin No. 21—*Review of the Literature of 1947 on Sewage and Waste Treatment and Stream Pollution.*

Legislative Bulletin No. 23—*Federal Legislative Report—80th Congress—2nd Session.*

Legislative Bulletin No. 24—*Federal Legislative Report—80th Congress—2nd Session.*

Legislative Bulletin No. 25—*Federal Legislative Report—80th Congress—2nd Session.*

In response to requests for an up-to-the-minute bibliography on waste treatment, *A Critical Review of the Literature of 1947 on Sewage an Waste Treatment and Stream Pollution* has been sent to all members. This annual publication was prepared by the Federation of Sewage Works Association's Committee on Research and will be sent to members annually.

Housatonic Group Organized

The Housatonic Valley Planning Ass'n., has been organized to fight pollution in the Housatonic River. State officials and civic groups have indicated complete cooperation in the long-range planning program.

Waxed Paper Industry Meeting

CHICAGO—The annual Fall meeting of the Waxed Paper industry will be held October 29 at the Congress Hotel, it is reported by A. H. Noelke, secretary-treasurer of the Waxed Paper Institute. The meeting, industry-wide, is open to all manufacturers of waxed paper.

H. L. Bills of the Saniwax Paper Co., Kalamazoo, Mich., chairman of the National Merchandising Program, and Howard H. Monk of Howard H. Monk & Associates, Rockford, Ill., will present 1948-49 plans.

An open discussion on the Statistical Program, lead by T. H. Osborne of the Zimmer Paper Products Co., Indianapolis, is expected to bring out information on the current supply-demand situation.

. The Industrial Relations Program will be discussed by M. M. Bartley of the Rapinwax Paper Co., Minneapolis.

Recent trends and developments on delivered-price merchandising will be covered by G. P. Lamb, of the law firm of Kittelle and Lamb, Washington, D. C.

Paper Napkin Summer Meeting

NEW YORK—The third annual resort meeting of the Paper Napkin Industry will be held at the Bedford Springs Hotel, Bedford, Pa., September 26-27, the Paper Napkin Ass'n. reports.

Representatives of all paper napkin manufacturers have been invited to attend to exchange ideas on mutual problems and questions. Wives of members have also been invited. In addition to the business session, the meeting will include a golf tournament.

A. W. Stompe of the Marathon Corp., Menasha, Wis., will preside at the business meeting on Sept. 27. Howard H. Monk, of Howard H. Monk & Associates, Rockford, Ill., will present the results of the first five months of the National Merchandising campaign recently inaugurated by the industry. E. W. Tinker, Executive Secretary of the American Paper and Pulp Association and George P. Lamb of the law firm of Kittelle and Lamb, Washington, D. C., will address the meeting.

July '48 Beats July '47

NEW YORK — According to the July issue of the Monthly Statistical Summary of the American Paper & Pulp Ass'n., paper and board production during July was seasonally low at 1,705,000 tons, but it shows a five percent increase over July of last year. Apparent per capita consumption for the first six months of 1948, on an annual basis, would indicate that it may run to 357 pounds, over seven percent above 1947.

Mill inventories of paper continue low in relation to sales and currently show no tendency to return to the prewar level.

With the drop in production of paper and paperboard during June to an index number of 189.6, the gap between the indexes of production and basic demand has been reduced from 17 points in May to eight in June.

Mill inventories of waste paper, pulpwood and wood pulp are reported in comfortable position.

Greece Gets E.C.A. Paper

WASHINGTON — Purchase of paper stock, paperboard and other paper and related products totaling $20,000 was authorized by the Economic Cooperation Administration on August 25, in behalf of Greece. The products are to be purchased in this country.

Porter Joins Fritz Paper

CHICAGO—Richard W. Porter was named editorial director of *Paper Industry & Paper World* on September 1 by Fritz Publications, Inc., Chicago.

—Also, Individual Paper Cups

TORONTO, Ont. — Among demands made by the Lumber & Sawmill Workers (A.F.L.) in negotiations late in August with 18 Northern Ontario pulp and paper operators was one for individual paper cups in mess halls.

Wage negotiations opened on August 19 are looked upon as important, not only to those directly involved, but to all Canadians, because this new wage crisis in the woods may bear the seeds of out-and-out war between Communists and anti-communists in the union's parent body, the Trades and Labor Congress.

The latest union demands include a general boost in pay of $2 a day to bring the lowest paid employes up to $8.50 a day and the highest paid over $20 a day. The extent of these demands recalls the demands made two years ago, which precipitated a disastrous six-weeks' strike in the industry.

Specific terms of a new agreement sought by the Lumber & Sawmill Workers' Union include the following:

(1) $2 a day more for all; $8.50 minimum for unskilled; cooks $10; cookees $7.70; blacksmiths $10.25; mechanics $10.55. (The highest paid workers, on piecework, already earn as much as $20 a day; cutters who saw fallen trees in four-foot lengths get $17 to $20 on piecework; haulers average $11.38 a day.)

(2) Individual paper cups (asked for for the first time).

(3) Recreation buildings with regular movie programs; library, including at least one copy each of two daily newspapers; radio, bulletin board. etc.

Pulp Storage Building Ready Oct. 1

NIAGARA FALLS, N. Y. — The wood pulp storage building being constructed on the west side of the Buffalo avenue plant of the International Paper Co. is expected to be ready about October 1. H. P. Bailey, general manager of the plant, said that the structure will hold 8,000 tons of wood pulp. The steel work is about half up, he reported. A spur track runs into the structure and the building will be equipped with three overhanging cranes for handling pulp.

Also in progress is extension of the office building on the river side of the building.

The work is part of the $1,250,000 expansion program announced in March for the Niagara Falls plant.

Eastman Expands Paper Facilities

ROCHESTER, N. Y. — Plans for construction of the first unit, at an estimated cost of $501,500, of a projected three-unit building to increase facilities for manufacture of photographic paper at Kodak Park have been filed with the city by the Eastman Kodak Co.

The initial unit will front 342 feet on the west side of Lake avenue, just south of Hanford Landing road, East, and will be 71 feet deep and 60 feet in height. It will be a three-story building with basement and a penthouse which will contain fans and motors for ventilation.

On completion of Unit 1, an outmoded adjacent one-story and basement building now used for making photographic paper will be razed and will be replaced by the second unit. If it is decided to build the third unit, the entire structure will be more than 250 feet in depth and will cost, it was believed, more than $1,500,000. Water will be supplied from the company's own main.

Gillespie To Speak In Chicago

CHICAGO — The Chicago section of TAPPI, formerly the Chicago Professional Paper Group, will hold a dinner meeting at the Chicago Bar Ass'n., 29 South La Salle street, on September 20. Dinner is scheduled for 6:30, with the meeting beginning at 7:30. Speaker is W. F. Gillespie, technical director of the Gaylor Container Corp., Bogalusa, La., National TAPPI president. Mr. Gillespie will review the development of the paper industry in the South, with special emphasis on the increase in production of kraft pulp during the last decade, as well as production of sulphite and groundwood pulp.

Scully Enters Law Practice

HOLYOKE, Mass.—George B. Scully, assistant secretary of the American Writing Paper Corp., resigned that position late in August to enter general law practice with Gregory J. Scanlon and Thomas C. Maher, attorneys, with offices in the Holyoke National Bank building.

Eames Covering New England

BOSTON — The Smith & Lane Co., mill representative of paper and cellophane specialty lines, box board, transparent containers and printed and plain specialty bags, 665 Atlantic avenue, is now represented in the New England territory by Herman Eames.

Mando Forestry Fellowship

MINNEAPOLIS—The Mando Graduate Research Fellowship in the Forestry college at the University of Minnesota, offered by the Minnesota & Ontario Paper Co., has been awarded for the coming year to Ralph Anderson of Squaw Lake, Minnesota.

Davis to St. Regis, Ltd.

MONTREAL — T. Cecil Davis, C.A., has been named comptroller and assistant treasurer of St. Regis Paper (Canada) Ltd. Mr. Davis previously held senior financial executive posts with Canadair, Ltd., and Bruck Mills, Ltd.

Downtown Co. Moves

PHILADELPHIA — The Downtown Paper & Stock Co., Inc., removed on August 25 from the Drexel building to suite 910, Lafayette building, across the street from the old address. Harold N. Newell is president of the firm.

Paraffine Building Near Metuchen

METUCHEN, N. J.—Ground has been broken at a 27-acre site nearby for a floor coverings plant for the Paraffine Co., Inc., to produce printed floor coverings and inlaid linoleum. It is expected to start operations late next year.

Paraffine now has a plant in Somerville, N. J., producing printed floor covering. A company spokesman said no decision has been made as to whether the Somerville plant will remain in operation after the Metuchen plant is occupied. L. S. Roesner & Co., of San Francisco, has been employed as consultant in connection with the project.

Tablet Paper for Korean Kids

LOS ANGELES—The California Congress of Parents and Teachers is sending a million sheets (four and one-half tons) of ruled tablet paper to the two and one half million children of South Korea. Leo B. Hart, adviser to the Department of Education, headquarters, South Korean interim government, invited the gift.

Drycor Now in Staffordsville, Ct.

STAFFORDVILLE, Conn. — The Drycor Felt Co. has completed removal from Belleville, N.J., to its new plant here. "The move was made without breaking continuity of manufacture by the installation of new equipment at Staffordville substantially duplicating the Belleville plant, resulting in a final doubling of the company's productive capacity," Harlan W. Clifton, vice-president, reports.

Ward Distributing Box Coverings

PHILADELPHIA — The D. L. Ward Co. has been appointed distributor for Nashua gummed and coated papers. In acquiring this line, the Ward company now operates a division which includes box covering papers from a number of other famous name mills, among them, the S. D. Warren Co. brands.

Hoff, Prucha, Smith Upped

DES MOINES, Iowa—Henry Hoff has been transferred to the local office of the Carpenter Paper Co., from Lincoln, Neb. Succeeding him there is Norman E. Prucha, transferred from Grand Island, Neb. Mr. Prucha's successor is Rex Smith, formerly a Carpenter salesman, working out of Lawrence, Kan.

Locker Paper Dispenser Carton

PORT EDWARDS, Wis. — A 24-inch dispensing carton of Nepco locker paper for home and farm freezer use has been developed by the Nekoosa-Edwards Paper Co. The corrugated board carton contains 250 feet of paper and has a metal tearing edge for ease of dispensing.

Superintendents' Atlanta Meeting

Atlanta-Biltmore Hotel, Oct. 20-23

PISGAH FOREST, N.C.—The tentative program for the joint fall meeting of the Southern and Southeastern Divisions of the American Pulp & Paper Mill Superintendents Ass'n., to be held at the Atlanta Biltmore Hotel, Atlanta, Ga., October 20-23, is reported to *Paper Trade Journal* by R. C. Bullock, secretary-treasurer, on August 25, as follows:

October 20

8:00 PM: Registration: Lobby Georgian Ball Room. R. C. Bullock and H. M. Morris.

October 21

8:00 AM: Registration: Lobby Georgian Ball Room. R. C. Bullock and H. M. Morris.

10:00 AM: Meetings Lee M. Bauer, chairman. Georgian Ball Room. *Invocation:* Rev. Vernon S. Broyles, Jr., North Avenue Presbyterian Church. *Address of Welcome:* Hon. William B. Hartsfield, Mayor of Atlanta. *Response:* William Brydges, trustee of American Pulp & Paper Mill Superintendents Ass'n. *Jonsson Screen:* Swen Falhgren, Bird Machine Co., South Walpole, Mass. *Vickery Felt Conditioner:* B. D. Warren, Bird Machine Co. *Labor Relations within Industry:* Austin M. Fisher, Fisher Associates, 250 Park avenue, New York.

12:30 PM: Joint Luncheon—Empire Room. (Principal speaker yet to be obtained.)

2:30 PM: Meetings: Georgian Ball Room—Frank M. Jensen, chairman; Rudy Kutter, vice-president and sales manager, Black-Clawson Co.; Tony Agronin, chief engineer, Shartle Bros. Machine Co. (Subject of papers to be given not yet released.) *Round-table discussion: Stream Improvement as related to Pulp and Paper Mills.* Russell Winget, executive secretary, National Council for Stream Improvement; Dr. Gehm, technical director, National Council for Stream Improvement; and Harold Morris, Mobile Paper Co.

8:00 PM: Movies: Georgian Ball Room. Walter L. Glass of F. C. Huyck & Sons Co., Georgetown, S. C., mill of Southern Kraft Corp.—Woodlands Film—Sports Film.

October 22

8:00 AM: Joint Breakfast: Empire Dining Room. Entertainment by International Brotherhood of Migratory Peddlers.

9:00 AM: Meetings: Frank M. Jensen and L. M. Bauer, co-chairmen. *Round-table discussion: Pulp Bleaching.* Vernon Woodside, Mathieson Alkali, Niagara Falls, N. Y.; R. L. McEwen, Buffalo Electrochemical Co., Buffalo, N. Y.; John Schuber, Solvay Process Division, Allied Chemical & Dye Co., Syracuse, N. Y. *Growth of the Southern Newsprint Industry.* (Speaker to be supplied by Southland Newsprint Co.) *Oil—A major item in Pulp and Paper Mill Maintenance.* John Hooten, Gulf Oil Co., Atlanta.

12:00 Noon: *Separate Business Meetings* and *Election of Officers:* Southern and Southeastern Divisions.

12:30: PM: Lunch—where you will.

2:00 PM: Golf: Capitol City Club. Under direction of Gene Bechard.

4:00 PM: Visit to Westinghouse Electric Corp.—Atlanta Plant. This plant is a short distance from the Biltmore Hotel.

7:00 PM: Cocktail Party: Pompeian Room. Courtesy: Mill Suppliers Committee, George Hardaker and George Witham, co-chairmen. Entertainment by Harry Hulmes accompanied by Miss Charlotte Bishman.

7:30 PM: Banquet. Toastmaster: L. M. Bauer, Ecusta Paper Corp., Pisgah Forest, N.C. Entertainment by Harry Hulmes, accompanied by Miss Charlotte Bishman. Presentation of golf awards by Gene Bechard. Introduction of new officers and guests. Presentation of chairman's certificate by O. W. Messner, national president. Introduction of guest speaker: R. C. Bullock. *Guest Speaker:* Dr. Josiah Crudup, president, Breneau College for Women, Gainesville, Ga.

9:00 PM until *12:00 MN: Dancing:* Master of ceremonies, Harry Hulmes. Music by George Hefferman's WSB Orchestra.

October 23

10:00 AM: No organized meetings.

2:30 PM: Football game at Grant Field. Georgia Tech vs. University of Florida.

Ladies Program

October 21

10:00 AM: Bus Tour. Meet in Biltmore Hotel Lobby. Visit Cyclorama—Grant Park, Atlanta residential district and Stone Mountain.

12:30 PM: Luncheon at the Plantation House.

4:00 PM: Fashion Show and Tea: Rich's department store.

8:00 PM: Movies: Georgian Ball Room, Biltmore Hotel. Walter L. Glass of F. C. Huyck & Sons.

October 22

8:00 AM: Joint Breakfast: Empire Room, Biltmore. Entertainment by International Brotherhood of Migratory Peddlers.

12:45 PM: Luncheon: Paradise Room of Henry Grady Hotel. Meet for this in Biltmore Hotel lobby.

(Continued on page 22)

New England Merchants Outing

Wannamoisett Country Club, Sept. 28

BOSTON—The Annual Fall Outing of the New England Paper Merchants Ass'n., Inc., is scheduled for September 28, at the Wannamoisett Country Club, Providence, (Rumford); R. I. Members of the Association will attend with their male guests (customers, mill executives and mill representatives). Sports programmed include golf, horseshoes, putting, bridge, and bowling-on-the-green. Official starting time is 1:00 p. m., although all club facilities, including the golf course, will be available to persons arriving earlier. Dinner, scheduled for 6:30 p. m., will be followed by the award of the numerous prizes in each event.

Invitations will be mailed shortly after Labor Day. Attendance of at least 150 is anticipated.

The club is reached via Alternate Route 1, from any direction.

The General Committee includes James L. Gardner, Narragansett Paper Co., Providence, (chairman); Morton C. Flemings of Chas. A. Esty Paper Co., Worcester, Mass. (vice-chairman); James C. Campbell, Industrial Paper & Cordage Co., Pawtucket; Charles J. Brown, Providence Paper Co., Providence; Le Roy M. Gardner, R. L. Greene Paper Co., Providence; E. Thomson Steen, Service Paper Co., Pawtucket; James T. McGowan, of the Carter, Rice & Co., Corp., Providence; E. Lindsay Cummings of the Storrs & Bement Co., Providence; A. E. Goldstein of A. E. Goldstein, Inc., Woonsocket; Neil S. Beckwith, Carter Paper Co., Springfield; Earl M. Norcross, Norcross-Eldridge, Inc., Rutland, Vt.; William H. Lippman of the Judd Paper Co., Holyoke; Samuel Toabe of the H. Berger Paper Co., Lawrence; George E. Bliss of the Robert A. Wilcox Co., Fall River; and William M. Crouch of the Equity Paper Co., Bridgeport.

Golf Committee: Frank W. Holden, Rourke-Eno Paper Co., Hartford, (chairman); Harry B. Mayberry of the C. M. Rice Paper Co., Portland; Richard S. Anderson of the Whitney-Anderson Paper Co., Springfield; Sterling R. Chatfield of Minotte E. Chatfield Co., New Haven; Lester D. Lott of Lott, Merlin, Inc., Stamford; Carl J. Knutsen of the H. J. Dowd Co., Inc., Cambridge; and Walter J. Butler of Perkins & Butler, Inc., Worcester.

Prizes Committee: James J. Dwyer of the Stone & Forsyth Co., Boston, (chairman); W. Edwin Porter of the Cook-Vivian Co., Boston; and Frank B. Cummings, treasurer, NEPMA.

TRENDS

Office of the PAPER TRADE JOURNAL,
Wednesday, September 1, 1948.

The uncertain condition of the waste paper market is giving so much concern and getting so much publicity that accurate facts seem either hard to get at or difficult to relate to the overall picture. Evidence of the confused thinking which has resulted appeared in a trade paper editorial last week when the writer challenged two reliable sources of information — Director Colley S. Baker of the Eastern Conservation Committee and W. L. Neubrech, Pulp and Paper Section, Forest Products Div., U. S. Office of Domestic Commerce — on what appeared to be contradictory statements. Another editorial of this week's date appeals to New York newspapers for accuracy.

Without attempting to reconcile the confusion, *Trends* reports facts obtained in the New York area. Trading continues excessively dull, also reflects pre-Labor Day mill shutdowns. Prices are at new lows with the exception of No. 1 News which has spurted $2 a ton. Collections of all grades for the year's 34 weeks are one-half of 1 percent ahead of the same period of 1947 and 13 percent ahead of 1946's; though for the week ended Aug. 21 they were 10 percent below the 1947 week. *News* collections are "considerably" behind a year ago and 5 percent behind consumption. Mill inventories of *news* grades are 10 percent less than a year ago. During the week ended Aug. 21 eastern mills took well over 10 percent of their consumption of *news* from their warehouses. Compared with last year, mills have consumed hundreds of tons more old containers, a "considerably greater amount" of *high grades,* substantially less *mixed,* and consumption of *news* is slightly behind 1947's period.

Commenting on waste paper in his August report, Mr. Neubrech of the Dept. of Commerce says that "a condition of excessive supplies especially of the bulky grades, together with a demand drastically restricted by mill shutdowns, characterizes the waste paper market." Our information is that the paper and paperboard market has been experiencing a summer lull such as was considered normal, prewar, and that paper and board mills have restricted operations for extensive repairs and vacations. Quoting from Mr. Neubrech's report: "According to trade reports from Commerce Department Field offices, the general market picture appears to be solidifying, following the considerable uncertainty prevailing since early in the year. Some of the fears prevalent in recent weeks seem to have dissipated and the majority of manufacturers, converters and wholesalers again look for a steady volume of business during the remainder of the year." It should be said at the same time that mills are keeping a sharp watch on inventories and prospects for Fall buying.

The Department's report states that, "In the New England market, waste paper dealers indicate that limited mill demand and continuing price declines persuaded them about the middle of July to discontinue paying for low grades of waste paper collected from department stores, office buildings and other places where waste is accumulated. Later in July, dealers began instituting a service charge for such collections." Such a practice had been suggested as a possibility for the New York area, but no reports of adoption have reached us. "Mills of the region are becoming increasingly quality-conscious and the rejection of carload lots is reported as frequently occurring. Dealers in the New England region are not stocking any grades and not only do they have small inventories but are discouraging collections. Peddler sources as a result are drying up rapidly which tendency is causing concern to dealers despite their unwillingness to accumulate stocks.

Demand for waste paper is likewise reported as quiet in the midwest area, due chiefly to the closing of several consuming mills which ordinarily utilize a considerable monthly tonnage. The lower Mississippi alone shows a different picture. Here "efforts have been made to stem further reductions in collection prices to dealers in order to avoid a breakdown in collection machinery, most consuming mills indicating a preference for maintaining local collections rather than risk seriously reducing tonnages of waste paper."

Director Baker of the ECC says that "The problem of supplying adequate quantities of well-packed waste paper is entirely in the hands of the waste paper industry which during recent weeks has been over supplied with paper stock." This might have been amplified to say that maintaining an adequate supply is the problem to which the joint Dealer-Mill Study Committee on Waste Paper Standards and Practices is giving conscientious effort. Also it is devoting research to new uses for waste paper. The ECC report continuing says "There are very definite signs that the mills will again be demanding greater supplies each week, and once again we hear of the likelihood of a revival of the export business." It is our information that while exports took a spurt in May to 15,905 tons, the highest since the record of March 1947 at 19,694 tons, they dropped in June and again are at usual levels. The margin for handling waste paper is reportedly so small and the requirements of export pack so heavy that the export market is described as "uncertain." Given a period of dull trading and heavy stocks such as currently exists, however, export has an appeal if only to keep stocks rolling. Without the dollars to support purchases, heavy export inquiry can be but conversation.

Feast or famine waves in waste paper trading have hit dealers and mills before. The National Association of Waste Material Dealers, Inc., has "been on the ball" for a long period, and the preliminary report of its joint Dealer-Mill Committee is offered for the purpose of getting criticisms and suggestions towards stabilization of the industry. *Paper Trade Journal* commends the worthy objective.

Indexes

Index of general business activity for the week ended August 21 sloped to 150.3 from 149.5 in the preceding week, compared with 144.3 for the corresponding week of 1947.

Index of paperboard production declined to 180.1 from 181.4 in the preceding week, compared with 172.5 in the corresponding week of 1947.

Comparative ratios of U. S. paper and paperboard production to mill capacity as reported by AP&PA are shown below:

	Aug. 21 1948	Aug. 14 1948	Aug. 23 1947	Aug. 24 1946	Aug. 25 1945
Paper* ...	97.3	**96.1	103.7	106.1	95.4
Paperboard	93.0	93.0	100.0	100.0	99.0

* Because of increases in 1948 capacity tonnage, production was greater than last year's although this year's production ratio is lower.
** Revised.

Paperboard Production (Tons)

	Aug. 21 1948	Aug. 14 1948	Aug. 23 1947
Production	185,537	184,342	177,212
New Orders	175,762	165,194	149,464
Unfilled Orders .	362,761	375,515	438,848

Percent of Activity ..... Current 93%
Percent of Activity ..... To date 97%

Swedish Trade With U. S.

AP&PA credits International Monetary Fund with the following report which appeared in its "Financial News Survey," Aug. 19, 1948 issue:

"The Swedish Parliament's Bank Committee has reported that prospects for the country's economy are darker than ever before. An especially important factor is the decrease of paper pulp exports to the U.S. which threatens to boycott Swedish paper-pulp and paper because Swedish prices are too high.

"Compared with last year, Swedish foreign trade developments are favorable, but the trade deficit is still too large. For the first six months of 1948, the deficit with the U.S. was SKr 223 million, compared with SKr 569 million in the corresponding period last year. The total trade deficit for the first six months of this year amounted to SKr 692 million against SKr 1,022 million in the same period last year.

"Because of decreasing foreign exchange holdings, Swedish authorities have been obliged to work out a new import plan which calls for dollar imports equaling SKr 180 million for the second half of 1948, compared with imports of SKr 407 million in the first half of the year. Under the plan for the second half-year, SKr 90 million is reserved for imports of fuel and SKr 60 million for imports of raw materials for manufacturing industries."

IMPORTS

Week Ended August 28

NEW YORK

Newsprint

N. Y. World Telegram, Tudor Prince, Cornerbrook, 1448 rolls.
N. Y. Sun, Tudor Prince, Cornerbrook, 776 rolls.
Gilman Paper Co., Tudor Prince, Cornerbrook, 478 rolls.
Clinton Paper Corp., Tudor Prince, Cornerbrook, 403 rolls.
Gilman Paper Co., Stockholm, Gothenburg, 143 rolls.
N. Y. Journal American, Markland, Liverpool, N.S., 509 rolls.
N. Y. Herald Tribune, Markland, Liverpool, N. S., 1861 rolls.
N. Y. World Telegram, Markland, Liverpool, N. S., 458 rolls.
Brooklyn Eagle Inc., Markland, Liverpool, N.S., 692 rolls.
Washington Post, (Alexandria, Va.), Markland, Liverpool, N.S., 2857 rolls.
Alexandria Gazette (Alexandria, Va.), Markland, Liverpool, N.S., 34 rolls.
Washington Daily News, (Alexandria, Va.), Markland, Liverpool, N.S., 335 rolls.
News Syndicate Co., Inc., Salmonier, Baie Comeau, 6391 rolls.
Daily Mirror, Ethel Tombs, Gatineau, 270 rolls.
News Syndicate Co., Inc., Colabee, Baie Comeau, 7381 rolls.
R. A. Olsen, Kermic, Donnacona, 378 rolls.
Malmar Paper Co., Netherlands Victory, Trieste, 37 rolls.

Drawing Paper

Nydegger Transport Corp., Arkeldyk, Rotterdam, 1 cs.

Wallpaper

Intramar Corp., America, Havre, 1 cs.

Napkins

Freund-Mayer Co., Falstria, Copenhagen, 80 pkgs., (paper).

Transparent Paper

M. J. Corbett Co., Inc., Blydendyk, Rotterdam, 2 cs.

Parchment Paper

George Lippelgoes, Jefferson City Victory, Antwerp, 2 cs.

Filter Paper

H. Reeve Angel & Co., Inc., American Miller, London, 20 cs.
C. H. Kent, Stockholm, Gothenburg, 1 cs.

Tissue Paper

Meadows Wye & Co., Britannic, Liverpool, 3 cs.

Photo Paper

(———), American Miller, London, 4 cs.
American Express Co., American Miller, London, 87 cs. (base).

Paperhanging

W. H. S. Lloyd & Co., American Miller, London, 37 cs.

Wrapping Paper

The Borregaard Co., Inc., Stockholm, Gothenburg, 91 rolls.

Strawboard

Consolidated Novelty Co., John B. Waterman, Antwerp, 7 bls.

Serviettes

H. W. Robinson Co., American Miller, London, 20 cs. (and table mats).
(———), Britannic, Liverpool, 13 crates (crepe paper).

Sulphite Paper

J. E. Bernard Co., Stockholm, Gothenburg, 78 rolls.

Miscellaneous Paper

Green Kriegsman Paper Co., American Importer, Hamburg, 1 cs.
Niels L. Nielsen, Stockholm, Gothenburg, 170 rolls.

Rags, Baggings, Etc.

Chemical Bank Trust Co., Netherlands Victory, Venice, 171 bls. waste bagging.
(———), Netherlands Victory, Venice, 58 bls. waste bagging.
Lush Cotton Products, Jalakendra, Calcutta, 100 bls. cotton waste.
Chase National Bank, Grigorios, Naples, 60 bls. white cottons.
Manufacturers Trust Co., Grigorios, Naples, 133 bls. old waste bagging.
H. Adlerstein, Grigorios, Naples, 56 bls. old jute bagging.
J. Stein, Bowmonte, Buenos Aires, 21 bls. rags.
Williamson Northrup, Horda, Santos, 103 bls. cotton waste.
Tradesmans National Bank Trust Co., American Miller, London, 67 bls. old khaki cotton webbing.
J. E. Bernard Co., Gudrun Maersk, Antwerp, 12 bls. threadwaste.
Midwest Waste Material Co., Gudrun Maersk, Antwerp, 183 bls. scrap bagging.
(———), Britannic, Liverpool, 28 bls. threadwaste.
Midwest Waste Material Co., John B. Waterman, Antwerp, 165 bls. waste cuttings.
A. de Vries Trading Corp., Jefferson City Victory, Antwerp, 63 bls. rags.
E. J. Keller Co., Inc., Jefferson City Victory, Antwerp, 130 bls. jute waste, 170 bls. old bagging.

Old Rope

Brown Bros. Harriman Co., Mathilda Thorden, Gothenburg, 61 coils.

Casein

National City Bank, Coracero, Buenos Aires, 360 bags (ground lactic).
(———), Coracero, Buenos Aires, 144 bags (ground lactic).
Hercules Powder Co., Bowmonte, Buenos Aires, 1250 bags (lactic).
National City Bank, Bowmonte, Buenos Aires, 900 bags.
American British Chemical Supplies, Brazil, Buenos Aires, 2000 bags, 600 bags (lactic).
The Borden Co., Chemical Division, Brazil, Buenos Aires, 2160 bags (ground lactic).
National City Bank, Vianna, Buenos Aires, 1000 bags.

Hidecuttings

(———), Agwidale, Havana, 55 bags (dry).

Woodpulp

Price & Pierce, Ltd., Stockholm, Gothenburg, 750 bls. strong sulphite pulp.
Cellulose Sales Co., Bernhard Ingelsson, Hernosand, 1475 bls. sulphite pulp.
Bulkley Dunton Pulp Co., Bernhard Ingelsson, Gefle, 1778 bls. dry sulphite pulp.
Cellulose Sales Co., Bernhard Ingelsson, Soraker, 450 bls. dry sulphite pulp.
Price & Pierce, Ltd., Markland, Liverpool, N.S., 4912 bls. unbleached Sulphite pulp.

ALBANY

Pagel Horton & Co., Inc., Bernhard Ingelsson, Gefle, 4535 bls. woodpulp.
Bulkley Dunton Pulp Co., Bernhard Ingelsson, Gefle, 1270 bls. dry sulphite pulp.
Pagel Horton & Co., Inc., Bernhard Ingelsson, Husum, 7620 bls. dry unbleached sulphate pulp.
(———), Bernhard Ingelsson, Husum, 625 bdls. wallboard.
Cellulose Sales Co., Bernhard Ingelsson, Hernosand, 1020 bls. sulphate pulp.
Cellulose Sales Co., Bernhard Ingelsson, Stugsund, 250 bls. airdry sulphite pulp, 1340 bls. airdry sulphate pulp.
Cellulose Sales Co., Bernhard Ingelsson, Soraker, 948 bls. kraft sulphate pulp, 1713 bls. dry sulphite pulp.

PHILADELPHIA

H. Adlerstein, Grigorios, Genoa, 153 bls. dark cotton rags.

BALTIMORE

E. de Vries Co., Blydendyk, Rotterdam, 93 rolls newsprint.

NORFOLK

Durham Herald Co., Inc., (Durham, N.C.), Blydendyk, Rotterdam, 78 rolls newsprint.

Austrian Paper Barters

In its largest sales of paper since the end of hostilities, Austria sold two shipments valued at $160,000 and $200,000 respectively to Hungary, according to report from the Austrian Consulate General received through AP&PA. Both sales were said to be compensation transactions whereby Hungary also will receive coal for home use, fruit and vegetables. The paper industry hopes to complete arrangements for further sale of paper worth $1,500,000 to Hungary before September.

Total paper exports for the first five months of 1948 were reported at 24,000 tons or about 75 percent of the quantity exported in like period of 1937. Italy, the largest consumer of Austrian paper, absorbs 10 percent of all exports. Switzerland, England, Greece, Yugoslavia and countries served via Denmark and Holland follow, in that order.

July Wood Pulp Imports

Imports of wood pulp into the U.S. from all sources totaled 182,859 short tons in July, 1948, according to preliminary figures, compared with 225,805 short tons in July, 1947, a decrease of 19 percent, the Dept. of Commerce announced today through its Office of International Trade.

Sweden showed the sharpest reduction with pulp imports from that country in July, 1948, dropping to 32,668 tons, 50.5 percent less than in July, 1947, according to statistics compiled by the Bureau of the Census.

Canada ranked as principal supplier in both years. Pulp imports from Canada in July, 1948, totaled 126,836 tons, an increase of 2,417 tons or 1.9 percent over July, 1947.

Pulp imports from Finland amounted to 20,619 tons in July, 1948, compared to 1947's July when 30,453 tons were received. Imports from Norway in July, 1948, totaled 836 tons, compared with 1,850 tons in July, 1947.

PRICES

Quotations indicate trends in an open market. At the moment they can be of little more value. While some volume business still is done under contract at the figures shown, fluctuations are too varied and frequent to permit prices to be interpreted as representing a wholly stabilized market.

NEW YORK

Paper

(Delivered New York)

Standard News, per ton—
- Rolls, contract $96.00/100.00
- Sheets ..... 111.00/ —

Kraft—per cwt.—Carload Quantities Zone A
Deld. 40 lb. base wgt.
- Superstandard Wrapping ..... $9.00/ —
- No. 1 Wrapping 7.25/ 8.00
- Standard Wrapping ..... 7.00/ —
- Standard Bag ..... 6.50/ —

Tissues—Per Ream 24x36 (480) 11 lbs. Zone 1.
- Wh. No. 1 Frd. ..... $1.84/$2.00
- Wh. No. 1 M. G. 1.94/ 2.00
- Wh. No. 1½ ..... 1.60/ —
- Wh. No. 2 ..... 1.75/ —
- Kraft Anti-Tar ..... 1.65/ —
- Kraft Unbl. ..... 1.85/ —
- Manila No. 2 ..... 1.62/ —
- Shred. Wh. No. 1 cwt. 1.10/ 1.50

Toilet—Per Case of 100 rolls—1 M Sheets.
- Unbleached ..... $8.50/$10.00
- Bleached 8.50/ 10.00

Paper Towels—Per Case of 3750—Zone 1.
- Wh. Jr. M'tif'd 9¼x9½ $5.15
- Br. Sr. M'tif'd 10x12 ..... 3.60
- Br. Jr. M'tif'd 9½x9¾ 3.10
- Br. Jr. Sgl. fold 10x10¾ 3.15

Manila—per cwt.—C-1 f.a.
- No. 1 Jute Tag ..... $14.50/ —
- Reg. Jute Manila ..... 13.25/$15.50
- No. 1 Manila ..... 9.75/ —
- 5 lb. Manila 10.75/ 11.25

Boards, per ton—
- Filled News ..... 94.00/ —
- Plain Chip ..... 90.00/ —
- Blchd. Mla. L-d. Chip* ..... 105.00/ —
- White Fat. coated* ..... 120.00/ —
- Kraft Liners 42 lb. ..... 105.00/ —
- Kraft Corr. .009 ..... 110.00/ —
- Binders Boards ..... 126.00/ —

* Base Prices per 10 tons. Less than 10 tons but over 3 tons, add $2.50; three tons or less, add $5; regular 35-39 basis, add $5; basis 40-49, add $2.50; basis 91-100, add $2.50; basis 101-120, add $5.

The following prices are representative of distributors' resale prices, all deliveries in Zone 1:

Rag Content Bonds and Ledgers—

White, 16 lb.

Bonds, per cwt.

	Carton	4 C't'n	Ton
100% Rag Ext. No. 1	$59.00	$54.55	$52.30
100% Rag	52.25	48.30	46.30
75% Rag	40.00	37.05	35.50
50% Rag	33.75	30.70	29.50
25% Rag	30.25	27.45	26.35

Ledgers, per cwt.

100% Rag Ext. No. 1	$57.00	$52.65	$50.50
100% Rag	50.25	46.40	44.50
75% Rag	40.00	37.05	35.50
50% Rag	33.75	30.70	29.50
25% Rag	30.25	27.45	26.35

Sulphite Bonds and Ledgers—
White, 16 lbs.

Bonds, per cwt.

No. 1	$21.25	$19.25	$18.50
No. 2	20.25	18.30	17.55
No. 4	19.25	17.55	16.85

Ledgers, per cwt.

No. 1	$21.75	$19.65	$18.85
No. 2	20.75	18.75	18.05
No. 4	20.00	18.10	17.35

Free Sheet Book Papers—
White, Cased Paper

	(Per cwt.) Case	Ton
No. 1 Glossy Coated	$20.40	$19.50
No. 2 Glossy Coated	19.15	18.30
No. 3 Glossy Coated	18.40	17.60
No. 1 Antique (Watermarked)	15.90	15.15
No. 2 Offset	15.15 to 17.90	14.60 to 17.10
A Grade E. F.	14.90	14.25
A Grade S. & S. C.	15.40	14.65
B Grade E. F.	13.90	13.30
B Grade S. C.	14.40	13.70

Wood Pulp

Domestic mill contract prices delivered with varying freight allowances.

	Per Short ADT
Groundwood	$80.00/$81.00
Unbleached Sulphite	124.00/ —
Bleached Sulphite	125.00/135.00
Bleached Soda	130.00/ —
Bleached Sulphate	175.00/185.00
Unbleached Sulphate Northern	125.00/155.00
Unbleached Sulphate Southern	130.00/145.00

Canadian Quotations

Prices delivered with varying freight allowances unless otherwise specified:

	Per Short ADT
Bleached Sulphate	160.00/185.00
Unbleached Sulphate	125.00/150.00
Unbleached Sulphite	125.00/126.00
Bleached Sulphite	125.00/135.00
Glassine Unbleached Sulphite (no freight allowance)	120.00/ —
Bleached Soda	130.00/ —
Groundwood	80.00/ 85.00
Sideruns Pulping News	80.00/ 90.00
Hardwood and Specialty Grades	Nominal

Swedish Quotations

On dock, Atlantic Ports

Bleached Kraft	185.00/ —
Bleached Sulphite	185.00/ —
Unbleached Sulphite	155.00/157.50
Unbleached Kraft	147.50/ —

Finnish Quotations

On dock, Atlantic Ports

	Per Short ADT
Bleached Sulphite	$187.50/ —
Unbleached Sulphite	155.00/157.00
Unbleached Sulphate	147.50/ —

New Domestic Cotton Cuttings

(F.o.b. Ship. Pt. Plus Dealer's Commission)

White Shirt	$11.00/$11.50
Unbleached Muslin	11.50/ 12.00
Light Silesias	9.00/ 9.25
White Back Blue Overalls	9.00/ 9.50
Blue Overalls	8.00/ 8.25
Fancy Shirt	6.50/ 7.00
Light Percales	8.50/ 8.75
Light Prints	7.50/ 7.75
No. 1 Washables	5.00/ 5.25
Bleachable Khaki	7.00/ 7.50
Unbleachable Khaki	6.00/ 6.50
Cottonades	5.50/ 5.75

Old Domestic Cotton Rags

(F.o.b. Ship. Pt. Plus Dealer's Commission)

	Per 100 lbs.
No. 1 Whites Repacked	$5.50/ $6.00
No. 1 Whites Miscellaneous	4.50/ 5.00
No. 2 Whites Repacked	3.50/ 3.75
No. 2 Whites Miscellaneous	3.00/ 3.50
Blue Overalls	3.75/ 4.00
Thirds and Blues Repacked	3.25/ 3.50
No. 1 Roofing Rags	1.70/ 1.80
No. 2 Roofing Rags	1.60/ 1.70
No. 3 Jute Bagging	1.50/ 1.60
No. 4 Brussels and hard back carpets	1.50/ 1.60
No. 5A Roofing Rags	1.50/ 1.60

New Foreign Cotton Cuttings

(Prices to Mill, F.o.b. Dock, N. Y.)

	Per 100 lbs.
New Dark Cuttings	$5.50/ $5.75
New Mixed Cuttings	6.25/ 6.50
Light Silesias	9.25/ 9.50
Light Flannelettes	9.25/ 9.50
New White Cuttings	12.00/ 13.00
New Unbleached Cuttings	12.25/ 13.00
Fancy Shirt Cuttings	6.50/ 7.00
Light Prints	7.75/ 8.00
Bleachable Khaki, No. 1	7.00/ 7.50
Unbl. Khaki, No. 1	6.25/ 6.75

Old Foreign Rags

(Prices to Mill, F.o.b. Dock, N. Y.)

	Per 100 lbs.
No. 1 White Linens	nominal
No. 2 White Linens	nominal
No. 3 White Linens	nominal
No. 4 White Linens	nominal
No. 1 White Cottons	8.00/ 10.00
No. 2 White Cottons	7.00/ 8.00
No. 3 White Cottons	6.00/ 6.50
No. 4 White Cottons	4.00/ 4.50
Extra Light Prints	6.50/ 7.00
Old Light Prints	4.50/ 5.00
Med. Light Prints	4.00/ 4.50
Dutch Blue Cottons	5.25/ 5.50
Checks and Blues	4.00/ 4.25
Linsey Garments	2.35/ 2.50
Dark Cottons, European	2.30/ 2.35
Dark Cottons, Egyptian	3.25/ 3.50
Old Shopperies	2.20/ 2.30
New Shopperies	2.25/ 2.30

Bagging

(Prices to Mill, f.o.b. N. Y.)

	Per 100 lb.
Foreign Gunny, No. 1	$7.25/ $7.50
Domestic Gunny, No. 1	7.25/ 7.50
Heavy Wool Tares	6.50/ 6.75
No. 1 Scrap Baggings	6.00/ 6.25
Roofing Bagging	1.50/ 1.75
Foreign Manila Rope	6.00/ 6.75
Domestic Manila Rope	6.50/ 6.75
Jute Strings	5.00/ 5.25
No. 1 Sisal Strings	5.25/ 5.50
Mixed Strings	1.75/ 2.50

Waste Paper

Base Prices to Mills for Average Packings
F.o.b. New York, Baled

	(Per Ton)
No. 1 Hard White Envelope Cuts	130.00/ 135.00
No. 1 Hd. Wh. Shavings, unruled	120.00/ 130.00
Super Soft White Shavings	115.00/ 125.00
No. 1 Soft White Shavings	100.00/ 110.00
No. 1 Fly Leaf Shavings	45.00/ —
No. 1 Gd'wd Fly Leaf Shavings	35.00/ —
No. 1 Heavy Books & Magazines	19.00/ 21.00
Mixed Books	13.00/ 15.00
No. 1 White Ledger	70.00/ 75.00
Col. Ledger	45.00/ 50.00
Manila Tab. Cards	80.00/ 85.00
New Manila Envelope Cuttings	90.00/ 100.00
Extra Manilas	25.00/ 30.00
Mxd. Kraft, Env. & Bag Cuttings	70.00/ 80.00
Kraft Envelope Cuttings	100.00/ 110.00
Triple Sorted, No. 1 Brown Soft Kraft	50.00/ 60.00
New Kraft Corrugated Cuttings	40.00/ 45.00
No. 1 Assorted Old Kraft	40.00/ 45.00
New Jute Corrugated Cuttings	18.00/ —
Old 100% Kraft Corr. Containers	30.00/ 35.00
Old Corrugated	14.00/ 15.00
No. 1 News	12.00/ 13.00
No. 1 Mixed Papers	7.00/ 8.00
Box Board Cuttings	7.00/ 8.00
White Blank News	65.00/ 70.00
Overissue News	16.00/ 18.00
Mill Wrappers	14.00/ 16.00

Twines

All Prices Nominal, F.o.b. Mill

(Soft Fiber)

Coarse Polished—India	.35¼/ .36½
Fine Polished Fine India	.41¼/ .45
Unpolished—Paper Makers	.32 / .35½
Tube Rope	.33¾/ .35¼
Wrapping	.37 / .39
Cotton	.63¼/ .66¾

(Hard Fiber)

Mex. Sisal	.21 / .27
Manila (Reprocessed)	.30 / .32

(American Hemp)

Polished Hemp	.36¾/ .60
Unpolished	.32¼/ .54

PHILADELPHIA

Domestic Rags (New)

(F.o.b. Eastern Shipping Point)

Shirt Cuttings—
- New White No. 1 ..... .10½/ .11
- New White No. 2 ..... nominal
- Light Silesias ..... .07½/ .08
- Black Silesias, soft ..... .06 / .06½
- New Unbleached ..... .10½/ .11¾
- Washable Prints ..... .06½/ .07
- Washable No. 1 ..... .05 / .05½

Blue Overall ..... .07½/ .08

Cottons—According to grade—
- Washable Shredding ..... .03 / .03½
- Fancy Percales ..... .06¾/ .07¼
- New Black Soft ..... nominal

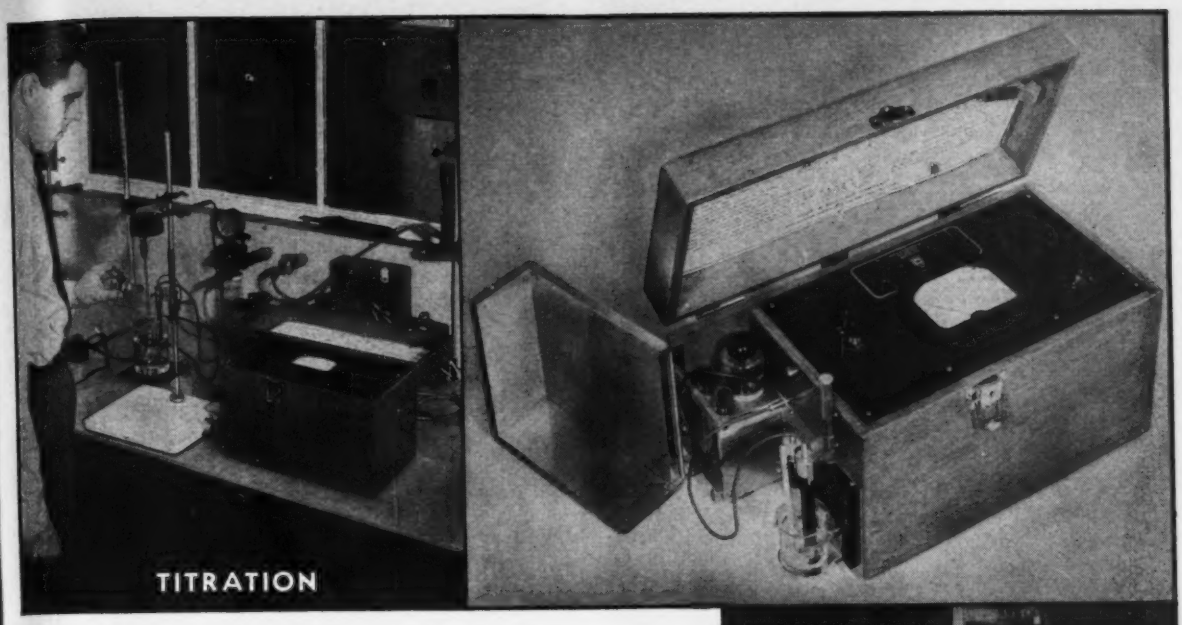
Khaki Cuttings—
- Unbleachable Cotton Cuttings ..... .05¾/ .06½
- Bleachable Cotton Cuttings ..... .06½/ .07
- Men's Corduroy ..... .05½/ .06
- Ladies' Corduroy ..... .05 / .05½
- Cottonades ..... .05½/ .06

Domestic Rags (Old)

(F.o.b. Eastern Shipping Point)

White No. 1—Repacked	4.50 / 5.00
Mixed White	4.00 / 4.25
White No. 2—Repacked	3.50 / 3.75
Thirds and Blues—	
Miscellaneous	2.50 / 2.75
Repacked	3.00 / 3.25
Roofing Stock—	
Foreign No. 1	nominal
Domestic No. 1	1.65 / 1.70
Domestic No. 2	1.55 / 1.60
Roofing Bagging	1.45 / 1.50
Old Manila Rope	— / 5.75

(Continued on page 18)



pH INDICATOR FOR "EVERYBODY"

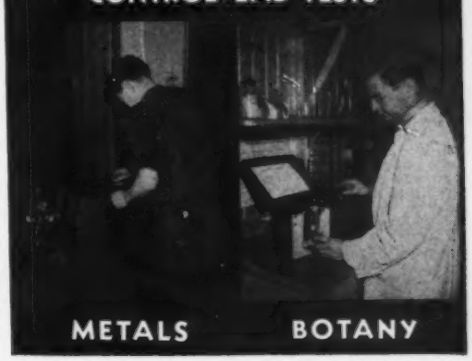
Here's the pH Indicator for the man who is *not* a pH expert. It's intended to be carried around and used wherever desired—in plants as well as labs. It's as sturdy and dependable as a temperature indicator. It will stay on the job. To use it, you just make 3 simple adjustments, then put the sample into the beaker and see where the needle points.

"Sticky" weather or surroundings won't affect this Indicator, unless relative humidity is over 95 and ambient temperature is over 85 F. It's fine for laboratories, kitchens, refrigerated chests, packing rooms and power plants.

Solution to be checked can be at any temperature to 50 C (120 F). Thick solutions and "soft" solids like butter, cheese, dough and many meats, earth, etc., can be checked almost as easily as slurries or clear liquids.

Nearby electrical equipment won't affect this instrument. It requires very little attention. Its scale is substantially longer and easier to read than in any comparable Indicator. Constructionally, it's a fine job. Complete with everything necessary for pH measurements.

Further details are in Catalog EM9-96, sent on request, but if you have a pH measuring problem we suggest you check with an L&N engineer.



LEEDS & NORTHRUP COMPANY, 4967 STENTON AVE., PHILA., PA.

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MEASURING INSTRUMENTS • TELEMETERS • AUTOMATIC CONTROLS • HEAT-TREATING FURNACES

Ind. Ad E-96(25)

PRICES

CONTINUED FROM PAGE 16

Bagging

(F.o.b. Eastern Shipping Point)

Gunny No. 1—	
Foreign	nominal
Domestic	$5.50 / 6.00
No. 1 Clean Bright—	
Sisal Strings	.04½/ .05
No. 2 Clean Bright—	
Sisal Strings	.03½/ .04
Sisal Jute	.02¾/ .03
Scrap—	
No. 1	5.00 / 5.50
No. 2	2.50 / 3.00

Old Papers

F.o.b. Phila. Mill Prices, Baled

No. 1 Hard White Envelope Cuts, one cut	$100.00/$115.00
No. 1 Hard White Shavings, unruled	100.00/ —
Soft White Shavings	80.00/ —
White Blank News	65.00/ 70.00
Soft White Shavings, One Cut	/ 80.00
No. 1 White Ledger	65.00/ 70.00
No. 1 Heavy Books & Magazines	20.00/ 22.00
Overissue Magazines	nominal
New Manila Envelope Cuttings	75.00/ —
No. 1 Assorted Old Kraft	35.00/ 40.00
No. 1 Mixed Paper	7.00/ 8.00
Box Board Cuttings	8.00/ 10.00
Kraft Corrugated Cuttings	75.00/ 80.00
Old Corrugated	14.00/ 16.00
Overissue News	13.00/ 15.00
No. 1 News	10.00/ 12.00

BOSTON

Old Papers

F.o.b. Phila. Mill Prices, Baled

No. 1 Hard White Shavings, unruled	$6.25 /$6.75
No. 1 Hard White Shavings, ruled	6.00 / 6.50
Soft White Shavings, Misc.	6.00 / 6.25
No. 1 Fly Leaf Shavings	— / —
No. 2 Fly Leaf Shavings	4.25 / —
No. 1 Grdwd. Fly Leaf Shvgs.	1.75 / 2.00
No. 2 Groundwood Fly Leaf Shavings	1.50 / 1.75
Mixed Colored Shavings	2.00 / 2.25
New Manila Env. Cuts, one cut	4.50/ 4.75
Hard White Envelope Cuts, one cut	7.00 / —
Triple S'ted No. 1 Br. Soft Kraft	3.75 / 4.00
Mixed Kraft Env. & Bag Cuttings	4.00 / 4.25
Kraft Envelope Cuttings	5.00 / 5.50
No. 1 Heavy Books & Magazines	1.75 / —
New Manila Env. Cutt'gs, one cut	—/ /
New Manila Envelope Cuttings	4.00 / 4.25
White Tabulating Cards	5.00 / —
Groundwood Tabulating Cards	1.50 / 1.75
White Blank News	2.25 / 2.50
No. 1 Assorted Old Kraft	3.50 / 4.00
No. 1 Mixed Paper	.47½/ —
Overissue News	.90 / 1.00
No. 1 News	.55 / .60
Box Board Cuttings	.60 / .70
New Corrugated Cuttings, Kraft	2.75 / 3.00
Old Kraft Corrugated Containers	2.00 / 2.25
Old Corrugated Containers	— / 1.10
Jute Corrugated Cuttings	1.07½/ —
Paper Strings	2.00 / 2.25

Bagging

(F.o.b. Boston)

Gunny Bagging—	
Foreign	(nominal)
Domestic	7.00 / —
No. 1 Old Rope	6.25 / —
Mixed Strings	1.60 / —
Transmission Rope—	
Foreign	nominal
Domestic	3.00 / 3.50
Manila Rope—	
Foreign	nominal
Domestic	6.25 / —
Jute Carpet Threads	6.00 / —
Bleachery Burlap	— / 7.00
Scrap Burlap—	
Foreign	6.00 / 6.25
Domestic	6.00 / 6.25
South America	6.00 / 6.25
Wool Tares	
Foreign	6.25 / —
Domestic	6.25 / —
Austr. Wool Pouches	7.50 / —
New Zealand Wool Pouches	7.50 / —
New Burlap Cuttings	6.50 / —
Heavy Baling Bagging	5.25 / 5.75
Paper Mill Bagging	5.50 / 5.75
No. 1 Roofing Bagging	2.25 / 2.50

Domestic Rags (New)

(F.o.b. Boston)

Shirt Cuttings—	
New Light Prints	.07½/ —
Fancy Percales	.08 / —
New White No. 1	.11 / .11¼
New Light Flannelettes	.08 / .08½
Canton Flannels, Bleached	.10 / .11
Underwear Cutters, Bleached	.11½/ —
Underwear Cutters, Unbleached	.11 / .12
Silesias No. 1	.08 / .08½
New Black Silestas	.04½/ —
Red Cotton Cuttings	.05 / —
Blue Overalls	— / .08½
Soft Unbleached	.11 / .12
Blue Cheviots	.08½/ .09
Fancy	.06 / —
Washable	.06 / —
Khaki Cuttings	.06½/ .07½
Corduroy	.03½/ —
Men's Corduroy	.04 / —
Khaki Canvas	— / .06
B. V. D. Cuttings	.11½/ —

Domestic Rags (Old)

(F.o.b. Boston)

White No. 1—	
Repacked	5.00 / 5.50
Miscellaneous	4.50 / 5.00
White No. 2—	
Miscellaneous	2.65 / —
Twos and Blues, Repacked	2.75 / —
Old Blue Overalls	4.00 / 4.50
Thirds and Blues, Repacked	2.20 / —
Miscellaneous	1.80 / —
Black Stockings	3.50 / 4.00
Roofing Stock—	
No. 1	1.70 / —
No. 2	1.60 / —
No. 3	1.50 / —
No. 4	1.50 / —
No. 5, Quality A.	1.60 / —
Quality B.	1.50 / —
Quality C.	.95 / —
Old Manila Rope	6.00 / —

Foreign Rags

(F.o.b. Boston)

Canvas	(nominal)
Dark Cottons	(nominal)
New Checks and Blues	(nominal)
Old Fustians	(nominal)
Old Linsey Garments	(nominal)
New Silesias	(nominal)

CHICAGO

Waste Paper

(F.o.b. Chicago) Mill Prices, Baled

Shavings—	
No. 1 Hard White Envelope cuts, one cut	$140.00/$150.00
No. 1 Hard White Shavings, unruled	130.00/ —
No. 1 Soft White Shavings	110.00/ —
No. 1 White Ledger	60.00/ 65.00
No. 1 Heavy Books & Magazines	28.00/ 30.00
White Blank News	50.00/ 55.00
Mixed Kraft Env. & Bag Cuttings	70.00/ 90.00
No. 1 Assorted Old Kraft	25.00/ —
Overissue News	16.00/ 17.00
No. 1 News	13.00/ —
No. 1 Mixed Paper	9.00/ —
Old Corrugated	15.00/ —
Mill Wrappers	11.00/ —

MARKETS

Blanc Fixe

Market unchanged. Demand strong. Prices firm. Pulp is currently quoted at $87.00 in bags, car lots at works, 6 cents per pound, l.c.l., deld.; by-product $77.50 per ton, car lots, at works, 6 cents per pound, l.c.l., deld.

Bleaching Powder

Supply adequate. Delivery good. Shortage of shipping containers restricts export. Prices range from $4.25 to $4.50 per 100 pound drums, l.c.l. works.

Casein

Trading continues dull. Domestic supply limited, with shortage foreseen by September. Prices softer. Current prices on processed acid precipitated casein at 30 to 31 cents per pound for domestic grades and 26 to 26½ cents for imported grades, f.o.b. shipping point.

Caustic Soda

Temporary easement in supply. Liquid supply slightly improved. Solid caustic is reported at $3.10 per cwt.; flaked and ground is quoted at $3.50 per cwt. in 400 pound drums, $4 to $4.25 per cwt. in 100 pound drums—car lots at works; liquid 50 percent in tank cars at $2.50 per cwt.; liquid 73 percent in tank cars at $2.60 per cwt.; at works.

China Clay

Demand steady. Supply excellent. Domestic filled clay is $9 to $11.50 per ton, car lots; coating clay is $14 to $22. Imported clay quotation, short tons, $16 to $35, export warehouse.

Chlorine

Demand slightly easier. Supplies tight. Currently quoted at $2.40 per cwt. in single unit tank cars; at $2.70 to $3.90 per cwt., in multi-unit tank cars, f.o.b., works.

Rosin

Market steady. Prices unchanged. Buying dull. Export inquiry good. Gum rosin in drums per 100 pounds net in car lots, f.o.b. Savannah; B, $6.50; G, $7.25; H, $7.25; I, $7.26; K, $7.28. Wood rosin per 100 pounds net, car lots, f.o.b. Savannah; B, $5.00; FF, $6.50.

Rosin Size

Seventy percent gum and pale wood grades. Supply ample. Demand good. Tank cars, $6.15 to $6.25, f.o.b. southern shipping point.

Salt Cake

Demand continues ahead of supply with slight improvement in shipments. Production under contract. Domestic salt cake quoted at $25 to $28.

Soda Ash

Supply-demand near balance. Deliveries close to schedule. Export likely to expand. Current prices, car lots per 100 pounds; in bulk, $1.15; in paper bags, $1.40; and in barrels, $1.90.

Sodium Bicarbonate

Steady demand with supply good. Reported as $1.95 per cwt. paper bags, carload lots.

Starch, Corn

Prices follow corn market down. Drop 35 cents per 100 pounds. Trading active for immediate needs. Supply good. Record crop forecast. Pearl grade quoted at $6.66 per 100 pounds; powdered starch at $6.77 to $6.81 per 100 pounds; car lots, New York.

Starch, Potato

Supply good with heavy crop forecast. High grade quoted at $6.00 cwt. f.o.b. Idaho, $6.75 f.o.b. Aroostook.

Sulphate of Alumina

Demand increased. Supply steady. The commercial grades are quoted at from $1.30 per 100 pounds, in bags, car lots, f.o.b. works. Iron free is $2.50 per 100 pounds in bags, car lots, at works.

Sulphur

Production shows heavy gain. Prices unchanged. Supplies ample. Annual contracts are quoted at $16 to $18 per long ton, f.o.b. mines; the price f.o.b. at Gulf ports is $17.50 to $19.50 per long ton.

Talc

Demand continues far in excess of supply. Prices steady. Domestic grades are currently quoted at $23 per ton in paper sacks, f.o.b. mills; Canadian at $35 and up per ton. All prices in cart lots.

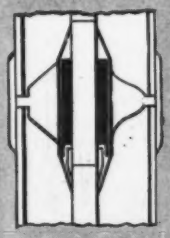
Tapioca Flour

Medium grade in limited supply, low grades adequate. Medium, quoted at $9.25 cwt., low grades, $8.25 cwt., on dock Atlantic and Gulf ports.

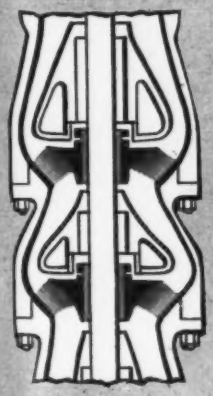
Titanium Dioxide

Supply of paper grades continues unequal to demand. Shipments on allocation. Anastase 17½-18c pound carload lots, 18-19c l.c.l., rutile, 19½-20c pound carload lots, 20-21c l.c.l.; 50-pound bags, f.o.b. plant, minimum freight allowance.

EASY ADJUSTABILITY. With one simple "at the surface" adjustment, you can vary capacities over a wide range without power-wasting "throttling." Adjustment nut can also be used to compensate for wear . . . assuring new pump efficiency *for the lifetime of the pump!*



QUIET, SMOOTH OPERATION. Pomona's revolvable rubber shaft bearings assure vibration-free shaft support under all conditions. .



FREEDOM FROM SAND-LOCKING. You won't have any costly stoppages with Pomona. Open impeller design assures complete freedom from sand-locking . . . minimizes wear . . . eliminates the need for sealing or wearing rings.

WATER LUBRICATION. Pomona's *true* water lubrication is your guarantee of clean, clear water. Water lubrication also means simplicity of design with fewer working parts for maximum dependability, lower operating costs, less maintenance.

IT isn't just chance that Pomona gives you all the features you've always wanted in a vertical turbine pump. Lowest-cost-per-gallon service . . . unequalled dependability . . . simplicity of installation and maintenance, these are "designed-in" features resulting from years of experience. Just check these features. You'll find what you want!

WHAT YOU WANT IN A PUMP YOU GET WITH

POMONA!

CHECK THESE and other "wanted" Pomona features with your Fairbanks-Morse Pomona dealer or branch pump engineer. They can show you how the Pomona line . . . sizes from 4 to 36 inches, capacities from 15 to 20,000 G.P.M. . . . gives you more!

Fairbanks, Morse & Co., Chicago 5, Ill.

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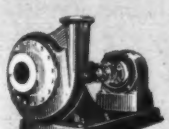
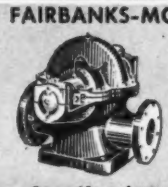
DIESEL LOCOMOTIVES • DIESEL ENGINES • PUMPS • SCALES • MOTORS • GENERATORS
STOKERS • RAILROAD MOTOR CARS and STANDPIPES • FARM EQUIPMENT • MAGNETOS

A FEW OF THE COMPLETE LINE OF FAIRBANKS-MORSE PUMPS



Trash Pumps

Side-Suction



Centrifugals

Builtogether

FINANCIAL RECORD

Preferred Stocks	Per Share Calendar Year 1947	Earnings 12 Mos. to Approx. 6/30/48	Indic. Annual *Divid. Rate	Sept. 1 Closing Market Price
Armstrong Cork Co. $3.75 Cum.	$38.64	$43.53*	$3.75	94¾
Armstrong Cork Co. $4.00 Cum. Conv.	38.64	43.53*	4.00	112
Celotex Corp. 5% Cum.	24.25c	$25.99f	1.00	
Champion Paper & Fibre $4.50 Cum.	65.90h		4.50	
Container Corp. of Amer. 4% Cum.	102.74	88.25	4.00	
Crown Zellerbach $4.20 Cum.	56.40h		4.20	100¼
Crown Zellerbach $4.00 Cum. Conv. 2nd	211.39h		4.00	
Dixie Cup Co. $2.50 Cum. Conv. Cl. A	9.16	8.59	2.50	
Flintkote Co. $4 Cum.	81.91	80.04	4.00	99½
Robert Gair Co. Inc. 6% Cum.	18.01	16.26	1.20	
International Paper Co. $4 Cum.	236.51	245.85	4.00	
Johns Manville $3.50 Cum.	128.81	134.48	3.50	
Kimberly Clark Corp. 4½% Cum.	70.03	73.34	4.50	
Kimberly Clark Corp. 4% Cum. Conv. 2nd	95.88	100.73	4.00	97
MacAndrews & Forbes 6% Cum.	62.20	62.56	6.00	
Mead Corp. 4¼% Cum.	81.56	79.68	4.25	92
Mead Corp. 4% Cum. Conv. 2nd	53.34	51.75	2.00	
Paraffine Cos. Inc. 4% Cum. Conv.	136.19a	151.93g	4.00	33
Rayonier Inc. $2 Cum.	13.58	15.44	2.00	
St. Regis Paper Co. 4.40% 1st A	76.93	84.43	4.40	
Scott Paper Co. $3.40 Cum.	43.95	50.24	3.40	
U. S. Gypsum Co. 7% Cum.	211.34	362.32	7.00	
United Wallpaper Inc. 4% Cum. Conv.	d	1.30j	2.00	
West Virginia Pulp & Paper 4½% Cum.	75.75c	78.49i	4.50	109
Common Stocks				
APW Products Co.	$1.24	$1.46	$0.25	
American Writing Paper Corp.	1.61	.47	0.25	
Armstrong Cork Co.	6.41	7.17	2.60	52½
Celotex Corp.	6.59c	7.08f	2.00	29⅜
Certain-Teed Prods. Corp.	3.75	3.92	0.90	16½
Champion Paper & Fibre	5.57h		2.00	24
Congoleum Nairn Co.	4.55	5.12	2.00	
Container Corp. of America	10.09	8.50	2.00e	37
Crown Zellerbach	6.81h		2.00	30⅜
Dixie Cup Co.	5.87	5.37	1.00	
Flintkote Co.	6.27	5.83	2.50	33⅞
Robert Gair Co. Inc.	2.83	2.59	0.40	8⅝
Great Northern Paper Co.	4.56	4.44	2.40	38
International Paper Co.	15.02	15.62	4.50	59¾
Johns-Manville Corp.	3.17	3.28	1.40	36¼
Kimberly-Clark Corp.	4.29	4.52	1.40	21⅞
MacAndrews & Forbes Co.	3.68	3.70	2.50	
Marathon Corp.	3.39c	3.93i	1.40	23
Mead Corp.	7.33	7.10	2.00	19⅜
National Container Corp.	4.13	3.11	1.20	10½
Paraffine Cos. Inc.	2.14a	2.39g	1.20	
Rayonier, Inc.	7.30	8.47	1.00	34¾
Ruberoid Co.	10.88	12.13	2.75	66⅞
St. Regis Paper Co.	2.66	2.87	0.60e	11⅞
Scott Paper Co.	3.02	3.49	2.20	
Sutherland Paper Co.	6.87	6.56	2.50	
Taggart Corp.	1.29		0.60	
Union Bag & Paper Corp.	7.93	8.35	3.00	35
United Board & Carton	4.95b		1.25	
U. S. Gypsum Co.	10.00	12.49	6.00	105½
United Wallpaper	d	0.11j	——	4⅛
West Virginia Pulp & Paper	11.40c	11.56i	3.00	

(a) Year ended 6/30/47
(b) Year ended 5/30/48
(c) Year ended October 31, 1947
(d) Deficit
(e) Plus extras
(f) 12 Months to approximately April 30, 1948
(g) Twelve months to approximately 3/31/48
(h) Year ended April 30, 1948.
(i) 12 Months to approximately July 31, 1948
(j) Year ending 6/30/48
(*) Pro forma

Dividends Declared

Puget Sound Pulp & Timber Co., on August 25 declared the regular quarterly dividend of 50 cents a share on the new common stock, plus an extra dividend of 25 cents, or a total of 75 cents a share, payable September 30 to holders of record September 10, 1948. Including this declaration, dividends paid or declared payable thus far in 1948 are the equivalent of $1.75 a share on the present stock which resulted from a two-for-one split completed July 15, 1948.

West Virginia Pulp & Paper Co. and subsidiary report for the nine months ended July 31 net profit of $8,001,819, equal to $8.35 a common share, against $7,878,734, or $8.19 a share, in the corresponding period last year. In addition, there was a non-operating net credit to surplus of $1,152,048 during the 1948 period from the sale of mature timber from the company's lands, it is stated.

United Wallpaper, Inc., is taking no action on a dividend payment on the common stock. Previously, an annual dividend of 25c a share was paid in August, 1947. For the fiscal year ended June 30, 1948, the company's operations resulted in a loss of $52,000 compared with a net profit of $1,842.44 in the previous year.

Imperial Paper & Color Corp. net sales for the fiscal year ended June 30 were $14,277,236, second largest in the company's history. The record was set in the previous year at $15,003,168. Net profit for the last fiscal year was $1,035,416 or $2.03 a capital share. In the previous year, net profits were $1,995,034 or $3.91 a share.

Hollingsworth & Whitney Co., raised the regular quarterly dividend to 62½ cents a share, placing the stock on a $2.50 annual basis. Payment date is September 11 to stock of record September 1.

United Board & Carton Corp.—Year to May 31: Consolidated net earnings, $1,222,735, equal to $4.95 a share on net sales of $12,103,320. No comparison with previous fiscal year is available.

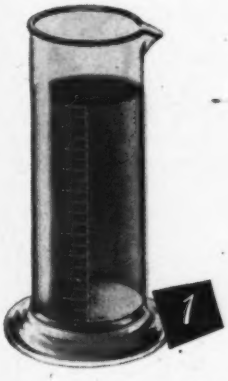
National Gypsum Co. on August 25 declared a 25-cent dividend on its common stock, payable October 1 to stock of record September 14. A similar dividend was paid on July 1.

Whitaker Paper Co.—Six months: Net income, $484,687 or $4.04 a share, against $451,661 or $3.77 a share, last year.

The A cumulative convertible preferred and common of St. Lawrence Corp., and the 6 percent cumulative preferred of St. Lawrence Paper Mills Co., was removed from the trading list of the Toronto Stock Exchange, on August 25. Under the arrangement, each A-share of St. Lawrence Corp., is exchangeable into the one new first preferred and the one new second preferred and $2 cash by the way of dividend, and npv common is exchangeable into one new common of $1 par value. Each 6 percent preferred of St. Lawrence Paper Mills Co., is exchangeable into one new first preferred and one new second preferred and $7.75 cash by way of dividend. The cash distribution and exchanges will be handled at The Royal Trust Co., offices in Toronto and Montreal.

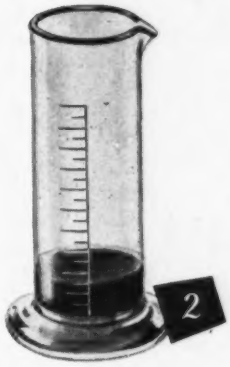
Gulfcrest is the only turbine oil that gets this *extra refining**

How the Alchlor Process* helps you keep your turbine system clean

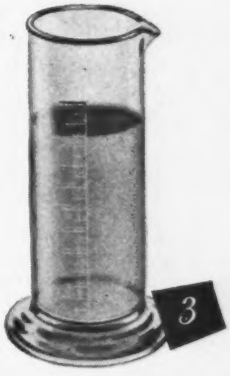


Gulfcrest is the only turbine oil that's Alchlor-processed.* This is an extra refining step. It makes Gulfcrest extra pure and extra efficient.

In Cylinder 1 you see the oil that will become Gulfcrest. It has already gone through the usual steps used in refining other turbine oils—but has not yet been Alchlor-processed.*



In Cylinder 2 you see the part — approximately 15% — discarded by the Alchlor Process.* This is the part that, when allowed to remain in turbine oil, is most likely to oxidize, increase neutralization number, and form sludge, emulsifiers, and harmful acids.



In Cylinder 3 you see the finished Gulfcrest—the incomparably pure lubricating oil that gives outstanding performance and helps keep steam turbine systems clean indefinitely. To make it even finer, special inhibitors are added to it — they give it even greater stability and protect against corrosion.

Call in a Gulf Lubrication engineer today and ask him to recommend the proper grade of Gulfcrest Oil to meet the specific requirements of your turbines. Write, wire, or phone your nearest Gulf office.

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GULF INDUSTRIAL LUBRICATION

Alkali Export Quota Quandary

WASHINGTON—Specific recommendations to overcome the problem of persistent over-subscription of alkali export quotas were submitted to the Office of International Trade by a special task committee of OIT's Alkali Export Advisory Committee at a meeting held in New York during the week ended August 21, the Department of Commerce said on August 27.

The special committee, which consisted of merchant exporters and producers, and which included association members and independents, was set up, after a meeting between OIT officials and a 31-member Alkali Export Advisory Committee representing the alkali trade, to comment on proposals made by OIT at that time. Members of the special committee, in addition to commenting on these OIT proposals, submitted specific recommendations of their own.

The basic problem involved in the distribution of alkali export quotas lies in the tremendous number of alkali license applications being received by OIT, many of which are virtually identical with respect to price and terms of delivery. The special committee concluded that, in addition to requiring full documentary evidence to prove the validity of transactions, OIT licensing officials should exercise full judgment to assure issuance of licenses for those uses which best advance the interests of the United States.

It also recommended that OIT establish definite and relatively low cutoff prices, to be arrived at by adding specified margins to manufacturers' published prices of caustic soda and soda ash. If the committee's recommendations were adopted, no applications for alkali would be licensed above the established cutoff prices.

The group placed responsibility for many recent alkali industry difficulties on back-door resale of inventory stocks by domestic consumers. It predicted increased supplies of alkalis and continuing downward trend in prices. The special committee credited the OIT licensing policy with contributing materially to the sharp decline from the excessively high alkali prices which prevailed at the beginning of this year.

The findings and recommendations of the group will be presented to the Commerce Department officials for consideration and possible revision of the procedure for the licensing of alkalies for export. This revised procedure would not in any event be applicable to third-quarter licensing, which is already in progress.

Supt's Atlanta Meeting

(Continued from page 13)

3:00 PM: Bridge and Bingo: East Lake Country Club. Buses leave directly from Paradise Room.

7:00 PM: Cocktail Party: Pompeian Room of Biltmore Hotel.

7:30 PM: Banquet: Georgian Ball Room.

9:00 PM: Dancing: Georgian Ball Room. Music by George Hefferman's WSB Orchestra.

October 23

10:00 AM: Shopping.

2:30 PM: Football Game — Grant Field. Georgia Tech vs. University of Florida.

Convention Committees

General Chairman, Lee M. Bauer, Ecusta Paper Corp., Pisgah Forest, N. C.

Entertainment Committee: Frank M. Jensen, St. Mary's Kraft Corp., chairman; Lee M. Bauer, R. C. Bullock, and Harold M. Morris.

Program Committee: R. C. Bullock, chairman; Andrew M. Downey, Florida Pulp & Paper Co.; Sidney R. Brown, National Container Corp.; Phillip J. Hannan, Southern Advance Bag Co.; and Harold M. Morris.

Golf Committee: Gene Bechard.

Ladies Committee: Mesdames Claude L. Huey (Chairwoman), Lee M. Bauer, Gene Bechard, Sidney R. Brown, R. C. Bullock, Andrew Downey, Phillip Hannan, Frank M. Jensen, Harold Morris, and Roland Wilbur.

Hospitality Committee: Frank M. Jensen, St. Mary's Kraft Corp., chairman; Lee M. Bauer, co-chairman; Roland Wilbur, Southern Paper Board Co.; William Robertson, Champion Paper & Fibre Co.; Phillip Hannan, and Harold Morris.

As of August 1, all room space at the Atlanta-Biltmore Hotel was sold out, Secretary Bullock reports. "We were able to secure room space at three other hotels nearby. These are the Imperial (Glenn Loudermilk, manager); the Cox-Carlton (W. J. Fox, manager); and the Georgian Terrace (Dewey D. Ellis, manager). It will be greatly appreciated if you will inform everyone desiring room space at any of these hotels to write direct to the manager of the hotel for reservations and to send a carbon copy of the reservation request to my office."

Production Ratio Report*

(Production as per cent of six-day capacity)

COMPARATIVE WEEKLY SUMMARIES

Current Weeks—1948		Corresponding Weeks—1947	
July 17	87.1	July 19	102.8
July 24	103.1	July 26	106.1
July 31	96.5	Aug. 2	103.9
Aug. 7	97.0	Aug. 9	105.1
Aug. 14 (Revised)	96.1	Aug. 16	104.8
Aug. 21	*97.3*	Aug. 23	103.7

COMPARATIVE MONTHLY SUMMARIES

1947						1948	
Jan.	102.1	May	106.2	Oct.	109.5		
Feb.	105.9	June	106.2	Nov.	109.3	Jan.	100.3
Mar.	106.1	July	93.5	Dec.	101.5	Feb.	99.8
Apr.	105.1	Aug.	104.2		——	Mar.	100.8
		Sept.	102.0	Year Avg.	104.3	Apr.	100.8
						May	100.5
						June	‡94.5
						July	‡*88.1*

‡ Preliminary Ratios.

COMPARATIVE YEARLY SUMMARIES

	1941	1942	1943	1944	1945	1946	1947	1948
Year to Date	94.5	93.5	88.2	87.9	87.8	99.9	103.7	97.5
Year Average	97.4	90.4	87.8	88.1	89.4	101.1	104.3	

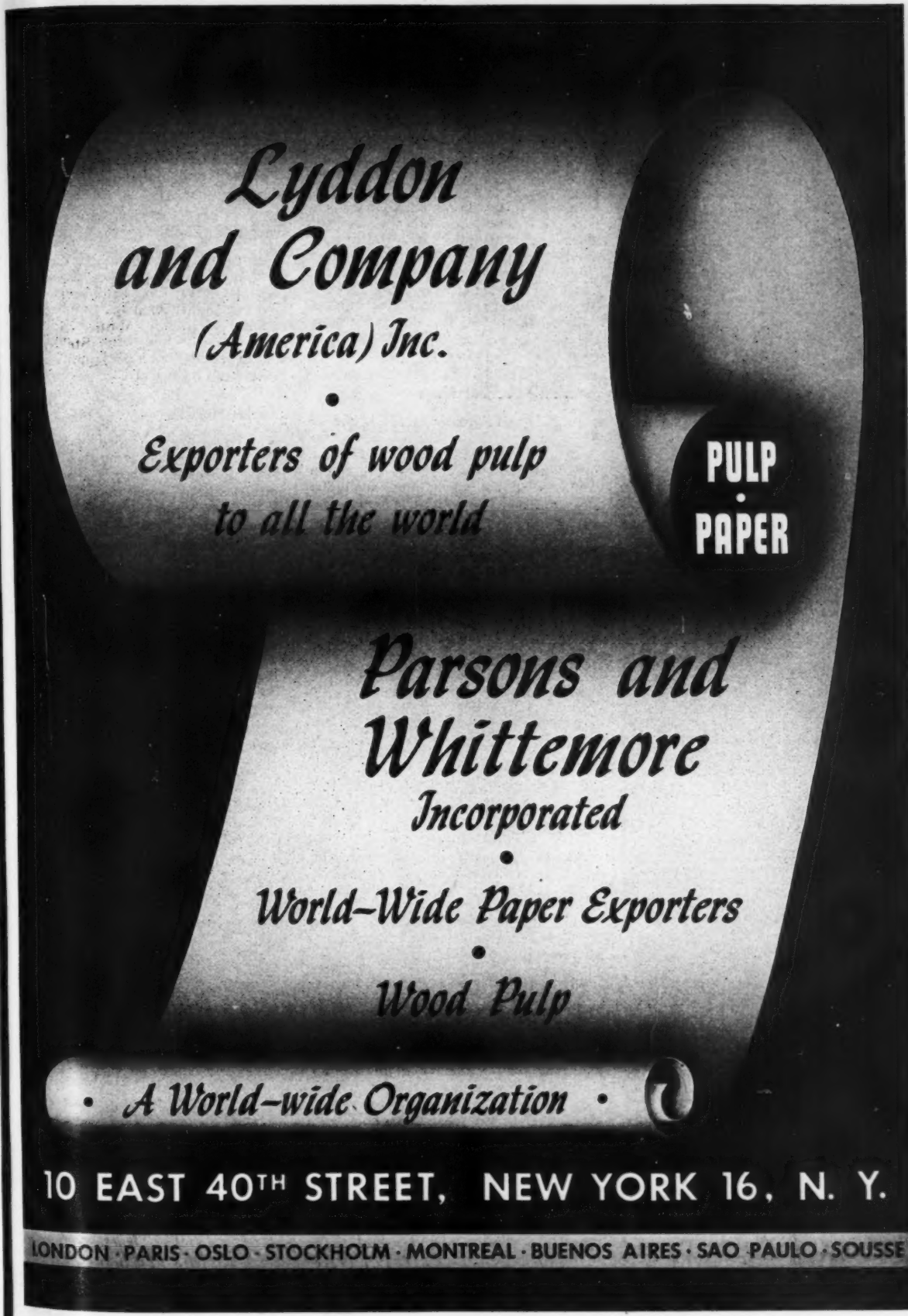
PAPERBOARD OPERATING RATIOS†

Current Weeks—1948		Corresponding Weeks—1947	
July 17	84	July 19	97
July 24	91	July 26	99
July 31	92	Aug. 2	99
Aug. 7	90	Aug. 9	97
Aug. 14	93	Aug. 16	100
Aug. 21	*93*	Aug. 23	100

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year Avg.
1947	99	103	101	100	101	101	90	99	96	101	99	89	98
1948	99	100	102	102	100	94	*81*						

* Based on tonnage reported to American Paper and Pulp Association. Does not include mills reporting to National Paperboard Association, except in isolated cases where both paper and paperboard are produced and separate tonnage figures are not readily available. Does not include mills producing newsprint exclusively.

† Per cents of operation based on "Inch-Hours" reported to the National Paperboard Association.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After you have your timber rights under control, call on EBASCO to get your new paper machine in operation at the earliest possible moment.

EBASCO engineers have the experience. They've installed 35 paper machines in the past 20 years. They have the skill and background for everything from original design to complete installation.

Here is a recent accomplishment. Working with an existing paper machine, they recently planned, designed, constructed and installed equipment for a modernized paper mill in only 16 months. Call on them for your next job—expansion, modernization or complete new paper mill.

If you'd like a complete outline of EBASCO's individualized services as engineers, constructors, and business consultants, write for our booklet THE INSIDE STORY OF OUTSIDE HELP. We'll send it to you promptly.

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Systems & Methods · Taxes · Traffic

OBITUARY

Jeremiah G. Harrington

Jeremiah G. Harrington, vice-president of the Milton C. Johnson Co., New York City, manufacturer of bank stationery, died on August 21 in St. Johns Hospital, Long Island City. He had been associated with the firm for 40 years. Surviving Mr. Harrington are his widow, Mrs. Margaret T. Harrington; four daughters, Mrs. Margaret Senz, Mrs. Mary Boden, and Misses Euleen and Joan Harrington; and four sons, Dr. Ronald Harrington, Francis, Gerald and Joseph Harrington.

John H. Kuechenmeister

John H. Kuechenmeister, 73, one of the founders of the old St. Louis Paper Can & Tube, who retired when the firm was sold to the Sefton Fibre Can Co., in 1927, died at his home in Ladue Village, St. Louis County, Mo., on August 17. Surviving him are his widow, Mrs. Martha Kuechenmeister; two brothers, Frederick and Frank, and a sister, Mrs. Minnie Christensen.

Isaac J. Marcuse

Isaac J. Marcuse, a director of the General Paper Co., Coatesville, Pa., and a former director of the Bedford Pulp & Paper Co., died of a heart attack at his summer home at Wake, Va., on August 24. Surviving Mr. Marcuse are a son, John A.; two daughters, Mrs. Percy Straus and Mrs. Leroy Cohen; a brother, M. M. Marcuse, and a sister, Mrs. Meyer Kirsch.

Edwin B. Miles

Edwin B. Miles, 81, of Hinsdale, Mass., former salesman with the White & Wyckoff Mfg. Co., Holyoke, for many years, died on August 15. Surviving him is a son, Edwin F. Miles, a sales representative in New York City of the Crocker, McElwain Co., Holyoke.

William R. Huey

William R. Huey, 69, general traffic manager of the Bemis Brothers Bag Co., died on August 22 in the Evanston (Illinois) hospital. He had been with the firm since 1917. He is survived by his widow, Mrs. Lynn Huey, and a stepson, Kenneth Callahan.

Charles E. Higgins

Charles E. Higgins, 54, safety engineer and assistant to the superintendent of the Strathmore Paper Co., Woronoco, Mass., and editor of *The Strathmorean*, died on August 16. Mr. Higgins was connected with Strathmore for 33 years.

Sewell T. Jamison

Sewell T. Jamison, sales engineer of the Pusey & Jones Corp., Wilmington, Del., died as a result of injuries sustained in an automobile accident near Greenwich, N. Y., on August 21, while on a business trip. Before the war, Mr. Jamison was associated with the Container Corp. of America. He was a Lieutenant Commander in the Naval Reserve during the war.

George R. Peabody

George R. Peabody, 72, former president and general manager of the Louis DeJonge Paper Co., Firchburg, Mass., died on August 26 at his summer home in South Orrington, Maine. Surviving him are his widow, Mrs. Stella (Conant) Peabody, and a daughter, Miss Margaret C. Peabody.

Charles Norz

Charles Norz, 64, head of the paper jobbing business bearing his name at 1914 Harmon street, Ridgewood, Queens, died at his home in Brooklyn, N. Y., on August 27. Surviving him are his widow, Mrs. Margaret Norz; a daughter, Mrs. Lucille Tierney, and a son, Charles Norz, Jr.

Francis A. Modricker

Francis A. Modricker, 42, a salesman for the W. C. Dodge Paper Co., Boston, for 22 years, died on August 25 at Chelsea Memorial Hospital. Surviving him are his widow; his mother, two sisters and two brothers.

Mark S. Wilder

Mark S. Wilder, 86, of Syracuse, Vero Beach and Alexandria Bay, Fla., former paper manufacturer, died at his summer home on Pine Tree Point near Alexandria Bay, on August 18.

Walter A. Newton

Walter A. Newton, 64, general sales manager of the Budge Carbon Paper Mfg. Co., died in Montreal, Can., on August 24.

John W. Narton

John W. Narton, 69, executive of the Harvey Paper Products Co., Sturgis, Mich., died on August 24.

Henry L. Mohan

Henry L. Mohan, 90, retired traffic manager of the Crocker - McElwain Co., Holyoke, Mass., died on August 23. He had been in failing health for the past five years. Mr. Mohan first worked for the old Crocker Division of the American Writing Paper Corp., then went to the Crocker - McElwain Co., with which he was associated until his retirement eight years ago. Surviving him are a daughter and six grandchildren.

INDUSTRIAL DEVELOPMENT

Laboratory Corrosion Tests of Iron and Steel Pipes

By G. A. Ellinger,[1], L. J. Waldron,[2] and S. B. Marzolf[3]

SYNOPSIS

Continuous flow laboratory corrosion tests of ten types of uncoated ferrous pipes were made over periods of time extending up to ten years. The corroding medium was Washington, D. C., tap water continuously circulated through columns of the test samples. Corrosion was measured as loss of weight and depth of pits in relation to the time of exposure. While most of the pipes corroded at somewhat similar rates, there were small but real differences in the corrosion of some of the materials.

Continuous-flow laboratory-corrosion tests of steel pipe, sponsored by the Republic Steel Corp. through the National Research Council, were started at the National Bureau of Standards in 1933. Only two compositions of steel pipes were included and each specimen was exposed for only an 8-week period. The results of these tests[4] were affected to a considerable extent by turbulent flow and other uncontrolled factors associated with the testing apparatus, and consequently were not conclusive. Since considerable interest was expressed by several agencies in extended pipe-corrosion tests, a new and more comprehensive investigation was undertaken by the National Bureau of Standards. This investigation was designed to test different types of commercially available pipes for a minimum of 3 yr. Specimens were to be removed from time to time and a sufficient number was to be included for extension of the test for as long as appeared to be desirable, perhaps up to 10 yr. To improve upon the earlier test results, changes were made in the apparatus to permit smooth non-turbulent flow of water through the specimens. The new tests were started in June, 1935, and, except for minor shutdowns for repairs or removal of specimens, ran continuously until June, 1945. At one time or another during the 10-yr. period, various individuals were associated with the test. It was initially directed by H. S. Rawdon. L. J. Waldron assembled the equipment, started the test, and conducted it during the first and last four years. In the interim, the experimental work was conducted by B. J. Baecher and T. D. Brown.

Fig. 1.—Test Apparatus Showing the Columns of Specimens in Place.

Materials and Method

The materials investigated were sections of (*a*) eight wrought pipes, three of these being made of open-hearth steel, two of ingot iron, and three of wrought iron; and (*b*) two cast-iron pipes, one centrifugally cast, the other

* Courtesy of American Society for Testing Materials.
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[2] Chemist, Naval Research Laboratory, Washington, D. C.
[3] Metallurgist, National Bureau of Standards, Washington, D. C.
[4] H. S. Rawdon and L. J. Waldron, "Continuous-Flow Corrosion Tests of Steel Pipe," *Proceedings*, Am. Soc. Testing Mats., Vol. 35, Part II, p. 233 (1935).

INDUSTRIAL DEVELOPMENT

Paper Trade Journal, in this section, makes space available for discussion of administrative and operating problems. Space is also available for the presentation of independent studies and research on technical and engineering subjects. Feature stories of paper mills, converting plants and inter-related industries will be included. An invitation is cordially extended to all who are qualified to discuss these subjects. Original manuscripts submitted exclusively to Paper Trade Journal and found suitable for use in this section will be paid for immediately upon acceptance. Submit manuscripts to E. P. McGinn, Industrial Editor.

TABLE I.—IDENTIFICATION SYMBOL AND COMPOSITION OF MATERIALS.[a]

Identification Symbol	Material	Composition, per cent									
		C	Mn	P	S	Si	Cu	Ni	Cr	Mo	Graphite
A	Wrought iron—aston process	0.02	0.04	0.092	0.025	0.18	0.03				
B	Wrought iron—hand puddled	0.02	0.06	0.16	0.012	0.12	0.04				
C	Cast iron—centrifugal cast	3.61	0.64	0.34	0.088	2.46	0.37	...	0.33	...	2.96
D	Cast iron—sand cast	3.57	0.54	0.57	0.071	2.26	0.15	...	0.09	...	2.97
E	Open hearth steel	0.18	0.43	0.010	0.017	0.18	0.05				
F	Copper bearing steel	0.11	0.42	0.007	0.022	0.19	0.29				
G	Ingot iron	0.02	0.03	0.005	0.026	0.01	0.05				
H	Cu-Mo ingot iron	0.03	0.14	0.008	0.012	0.01	0.45	...	...	0.07	...
I	Cu-Cr-P-Si steel	0.08	0.21	0.16	0.016	0.80	0.39	...	1.10	...	...
J	Nickel-bearing wrought iron	0.02	0.05	0.087	0.012	0.10	0.08	1.72	...	...	...

[a] Analyses made by Chemistry Division, National Bureau of Standards.

sand cast. The identification symbols and chemical compositions are given in Table I.

The wrought pipes were of standard weight, with a nominal 2-in. diameter and a wall thickness of about 3/16 in. The cast-iron pipes had slightly thicker walls, that is about ¼ in., and slightly smaller internal diameters.

The method used was that of circulating Washington, D. C., tap water through a system of columns built up of test sections of these pipes. A photograph of the apparatus with all of the columns in place is shown in Fig. 1. The details of construction and the plan of operation are shown in Fig. 2.

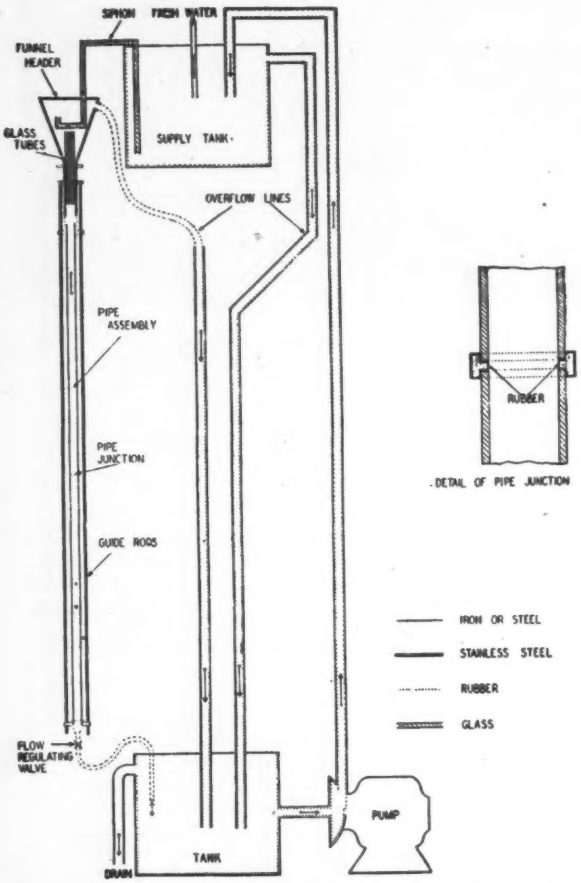

Fig. 2.—Sketch Showing the Details of Assembly and Operation of the Test Apparatus.

Specimens 5½ to 6 in. long were cut from the pipes and the ends were machined smooth and parallel on a lathe. In order to remove all surface dirt, grease, and mill scale, the speciments were cleaned prior to testing, by the following operations:

(*a*) Washed in strong alkali or soap solution,
(*b*) Rinsed in water.
(*c*) Pickled in warm 10 per cent sulfuric acid solution containing a commercial inhibitor,
(*d*) Washed in clean soap solution,
(*e*) Brushed in hot running water, and
(*f*) Dried.

move, steel wire brushing was employed. The castiron

A bristle brush was used for removing surface dirt, but when this adhered tightly and was difficult to respecimens were cleaned very carefully so as not to remove the casting surface; immersion in the acid was therefore brief and brushing was held to a minimum. Each of the specimens was weighed and measured prior to exposure.

Fourteen specimens were assembled to form each column, there being eight of these columns in the apparatus. The details of the method of assembling the columns are shown in Fig. 3. Metallic contact and subsequent galvanic action between adjacent specimens was prevented by the use of rings of hard rubber. The specimens were fitted securely into recesses machined in the separators and the entire column was made watertight by tightening three equally spaced external tie rods. Care was taken to secure junctions as smooth as possible, since any projection, crevice, or irregularity would interfere with the normal flow of the water and create artificial turbulence and eddies, which might affect the results. Turbulence of the water entering the

TABLE II.—NUMBER OF SPECIMENS EXPOSED FOR EACH PERIOD.

Exposure Period, months	Materials A, B, E, F, G, H	Materials C, D	Materials I, J
6	3	2	2
12	2	3	2
18	1	..	..
24	1	1	1
30	1	..	..
36	2	2	2
42	1	1	1
48	3	2	2
54	1	..	..
60	3	2	2
72	5	4	3
84	2	1	2
120	3	..	..

[b] The number of specimens was determined by the conditions of the experiment from time-to-time and not by a predetermined plan.

TABLE III.—AVERAGE COMPOSITE MINERAL ANALYSES OF WATER (PARTS PER MILLION) WASHINGTON, D. C.

Year ending June	Total Solids	Organic Matter	Silica	Iron	Calcium	Magnesium	Chloride, Cl	Sulfate SO_4	Bicarbonate HCO_3	Total Alkalinity, $CaCO_3$	pH	Carbon Dioxide	Total Hardness $CaCO_3$	Non CO_3 Hardness	O_2 Consumed
1936	140	46	1.6	0.03	31	3.1	6.3	31	70	57	7.7	2.0	82	25	0.5
1937	142	46	2.0	0.03	29	3.9	5.8	31	74	56	7.5	2.6	90	34	0.7
1938	128	39	1.9	0.04	28	3.7	5.9	29	64	51	7.7	1.7	83	32	0.7
1939	131	38	2.0	0.06	26	4.1	5.6	30	64	53	7.8	1.8	85	29	0.6
1940	134	39	2.8	0.07	30	3.3	4.7	33	69	57	7.8	1.9	87	28	0.9
1941	130	38	2.2	0.03	26	4.4	6.4	28	68	59	7.9	1.2	84	25	1.2
1942	158	49	2.4	0.03	34	5.2	4.1	36	82	66	7.9	2.0	103	36	1.3
1943	132	21	6.0	0.04	27	5.5	4.1	29	68	55	7.7	2.9	88	31	1.3
1944	143	18	4.9	0.04	31	6.4	6.0	36	80	67	7.6	3.3	101	35	1.8
1945	138	14	4.8	0.04	28	5.8	2.9	35	76	64	7.7	3.7	98	34	1.1
Average	138	35	3.1	0.04	29	4.5	5.2	32	72	59	7.7	2.3	90	31	1.0
Max.	225	70	9.4	0.16	70	10.1	10.1	53	122	100	8.1	8.7	148	48	...
Min.	81	11	0.6	0.01	18	1.2	0.5	20	35	29	7.1	0.3	60	10	...

apparatus was prevented by the insertion of a numbr of parallel glass rods in the top of each column. Each column was supported in a vertical position and maintained in a watertight condition by the tie rods, guide and supporting sleeves, and stainless steel holders. The equipment was designed to permit the continuous exposure of the inner surfaces of all of the specimens in as identical a manner as possible to water of known composition and moving at a constant velocity. The water within the apparatus came in contact only with the metal specimens, rubber, glass, and stainless steel (18 per cent chromium-8 per cent nickel).

The capacity of the entire apparatus, including the top and bottom tanks and all columns and overflow pipes, was about 70 gal. The water circulation through the columns and overflow pipes was 40 to 50 gal. per min., and the water flow was maintained at a linear velocity of 30 ft. per min. by an adjustable orifice and manometer at the lower (outlet) end of each column. Fresh tap water was admitted to the top supply tank every three or four hours in amounts equal to the capacity of the system, a corresponding amount overflowing into the drain from the lower tank.

Six of the columns each contained specimens of only a single material, the seventh column contained specimens of materials I and J, while the eighth contained specimens of the two cast irons, materials C and D. Individual specimens were removed from each of the columns and were replaced with new ones of the same materials at the end of specified test periods, ranging in length up to 10 yr. The number of specimens exposed for each period, in months, is given in Table II.[5] The two cast irons, C and D, the Cu-Cr-P-Si steel I, and the nickel wrought iron J were exposed for a maximum of 7 yr., while all other materials were exposed for 10 yr.

It was necessary to protect the exterior surfaces of the specimens from corrosion during the life of the test.

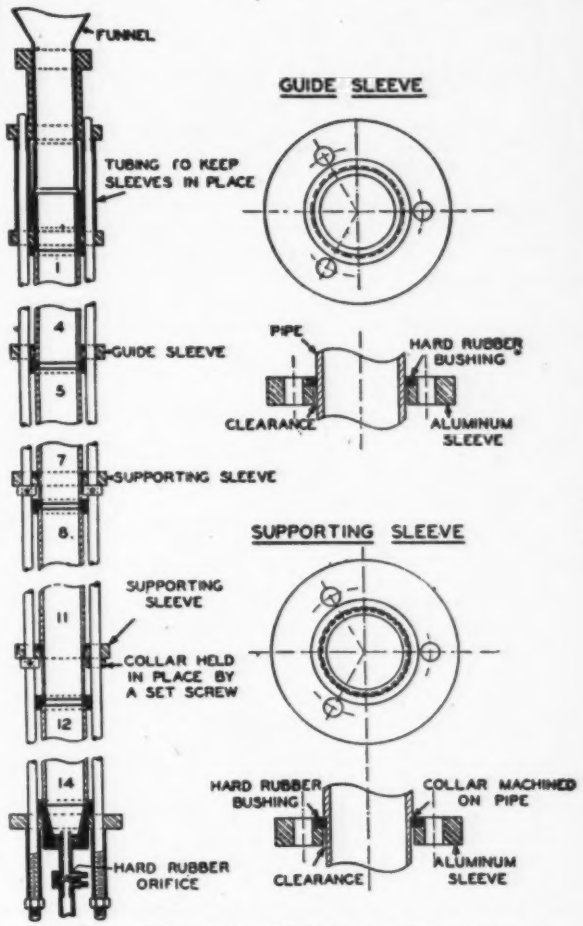

Fig. 3. Method of Assembling Specimens into a Column.

TABLE IV.—AVERAGE LOSS OF WEIGHT [a]

Exposure Period, months	Average Loss of Weight, g. per sq. dm.									
	Material A	Baterial B	Material C	Material D	Material E	Material F	Material G	Material H	Material I	Material J
6	6.1	5.6	6.0	1.5	6.0	6.7	6.6	5.1	5.8	5.0
12	9.1	9.0	10.2	8.1	9.4	9.3	8.9	9.2	9.5	7.9
18	12.4	11.2	—	— [b]	12.5	12.5	10.6	11.0	— [b]	— [b]
24	11.7	11.5	13.7	4.8	12.8	14.1	11.4	11.8	13.9	10.2
30	12.3	13.1	— [b]	— [b]	13.4	13.5	12.1	12.7	— [b]	— [b]
36	13.9	13.3	15.5	10.2	13.8	15.1	14.2	14.0	15.4	12.9
42	17.9	17.7	16.6	9.1	16.2	15.9	17.1	13.5	14.3	15.9
48	16.7	15.7	17.3	11.7	15.2	16.4	15.3	15.8	17.3	15.7
54	15.4	15.1	— [b]	— [b]	17.1	19.2	15.3	16.1	— [b]	— [b]
60	18.3	16.0	24.0	21.0	17.8	18.9	16.7	18.6	19.9	18.4
72	22.2	20.2	16.7	24.2	22.8	20.5	19.3	21.7	22.2	20.0
84	24.1	26.3	24.2	10.7	25.0	21.7	21.3	22.1	28.1	21.3
120	33.2	23.9	— [b]	— [b]	27.4	26.8	26.5	22.4	— [b]	— [b]

[a] Based on results for one to five specimens; see Table II.
[b] A dash indicates that no specimen was exposed for that period.

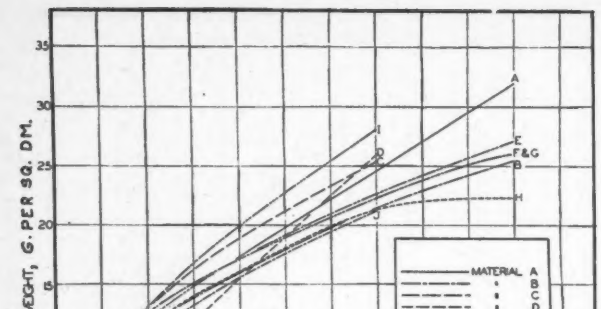

Fig. 4.—Loss of Weight of the Various Materials During the Progress of the Test.

Originally all of the specimens were coated with a petroleum jelly-benzol mixture after installation, but because this could be easily removed accidentally an asphalt varnish was subsequently used for this purpose.

After removal from the test columns, the specimens were dipped in trichlorethylene to remove the varnish and then were cleaned free of corrosion products by the following operations:

(*a*) Brushed with a soft bristle brush under water,
(*b*) Immersed in a 10 per cent sulfuric acid solution containing a commercial inhibitor.
(*c*) Brushed with a wire brush,
(*d*) Washed in hot water,
(*e*) Dipped in dilute caustic soda solution,
(*f*) Washed in hot running water, and
(*g*) Dried.

After cleaning by this method the interior surfaces of the specimens were clean and bright. The time of immersion in the inhibited acid was generally not more than 1 hr. except for those specimens removed after 10 yr. exposure. The corrosion products on these specimens were quite adherent and sometimes required several hours immersion before they could be completely removed. The alkali dip prevented the slight corrosion and discoloration which would otherwise have occurred during drying. Early in the investigation the efficacy of the cleaning procedure was tested by subjecting uncorroded samples of the various materials to the complete cleaning cycle. The "blank" losses thus obtained were found to be so small that they were disregarded in the final calculations.

The specimens were weighed and the corrosion losses were calculated in grams per square decimeter of interior surface area. The specimens were then sawed longitudinally and the depths of the pits on the corroded surfaces were measured in the following manner:

Early in the test, when the pits were comparatively shallow, a depth micrometer was used for their measurment. In the later stages when the pits were much deeper a micrometer caliper with a pointed spindle was used. The point fitted into the bottom of the pits with the anvil of the caliper in contact with the outer semicircular surface of the pipe. The thickness of the wall was measured at the bottom of the pit and the pit depth was determined by subtracting this thickness from that of either (*a*) the nearest uncorroded high spot or (*b*) the original wall thickness of unexposed specimens of the same material. Method (*a*) was used in the early stages of the test when considerable portions of the interior surfaces were uncorroded. However, in the later periods it was difficult to find uncorroded areas and it was necessary to resort to method (*b*). Twenty measurements were made at random on each specimen, ten on each half section.

Water

The water used for the investigation was Washington, D. C., city water taken directly from the supply line. The average composite mineral analyses for each year of the test as obtained from the District of Columbia Filtration Plant are given in Table III. The maximum and minimum values represent the extreme range of single analyses for the entire 10-yr. period.

Results and Discussion

The corrosion of the interior surfaces of the pipes started with the formation of small localized mounds of rust, the number and size of which increased with time. The rust which formed during the first year or two was lightly adherent and was easily removed. As the corrosion continued, the rust coating became denser, more tightly adherent, and was removed with greater difficulty. Most of the mounds developed into a tubercular form of rust. Many uncorroded areas were found on the surfaces of most of the specimens during the first several years of testing, but few were found on specimens exposed for more than 5 yr. The pH-alkalinity relationship of the water was such that small amounts of calcium carbonate were deposited with the rust, probably increasing the protective effects of the rust coating.

The results of corrosion tests usually show considerable scatter among the individual specimens, and the results of this test are no exception. A rather definite trend was established, however, early in the test and continued throughout its life. Materials which showed the highest losses of weight or depth of pits in the early stages generally maintained this trend throughout.

The average loss of weight for each of the materials after each exposure period is given in Table IV, the average depth of the five deepest pits in Table V, and the depths of the deepest pits in Table VI. The variation of the loss of weight and average depths of pits with time are shown as curves plotted by a least squares method in Figs. 4 and 5, respectively. It was not pos-

TABLE V.—AVERAGE DEPTH OF FIVE DEEPEST PITS (mils.)[a]

Exposure Period, months	Material A	Material B	Material C	Material D	Material E	Material F	Material G	Material H	Material I	Material J
6	19	19	none	none	18	17	15	14	23	14[b]
12	27	23	13	none	19	17	18	25	34	22
18	25	25	—[b]	—[b]	27	22	30	24	—[b]	—[b]
24	32	42	17	22	31	30	30	27	38	25
30	31	39	—[b]	—[b]	21	24	19	20	—[b]	—[b]
36	38	40	15	24	36	25	30	33	46	25
42	28	33	none	none	22	28	19	28	49	31
48	39	41	17	none	37	27	35	27	48	27
54	39	44	—[b]	—[b]	34	27	35	38	—[b]	—[b]
60	39	44	29	27	39	35	30	31	53	30
72	37	44	22	37	36	40	38	31	54	34
84	39	55	27	51	47	37	45	31	62	30
120	50	55	—[b]	—[b]	46	50	50	39	—[b]	—[b]

[a] Based on results for one to five specimens; see Table II.
[b] A dash indicates that no specimen was exposed for that period.

sible to plot similar curves for the depths of the deepest pits because of inconsistent results obtained during the various test periods.

The loss of weight of all of the wrought materials and the centrifugally cast iron pipe C was relatively rapid during the early stages of the test, after which the rate decreased gradually and became more or less constant. The sand-cast iron pipe D behaved in a somewhat erratic manner and the best curve which could be drawn was a straight line. At the end of seven years, however, this material had experienced about the same weight loss as that of the centrifugally cast iron.

Since there were not enough specimens to test all of the materials for 10 yr., comparisons of the results cannot be extended beyond the 7-yr. period. At this point the specimens fell into three groups, materials B. E. F. G. H. and J having the lowest corrosion losses, materials A. D. and C with somewhat higher losses, and material I, which had the highest loss. This grouping is, of course, sensitive to the length of exposure at which the comparisons are made.

For those specimens tested for 10 yr the trend was approximately the same as for 7 yr. The only exception was a decrease in the corrosion rate of material H.

The average depths of pits at the end of 7 yr., Table IV and Fig. 5, showed considerably more difference than the average losses of weight. The results indicated that the materials could be divided into three groups, Materials C, J. and H having the shallowest pits; materials A. E. G., and F intermediate pit depths; and materials D, B, and I the deepest pits. There was some scatter in the results obtained from individual specimens of each material, due probably to localized concentration of the corrosion attack at certain points by selective action.

The shallowest pits occurred in the centrifugally cast iron, while the sand-cast iron had pits approximately twice as deep. Since the loss of weight was about the same for each material, the results indicate that the corrosion of the centrifugally cast iron was general, with little localized deep pitting; that of the sand-cast iron was largely by deep pitting. The condition of the casting skin of these materials was probably largely responsible for this difference in corrosion characteristics.

Wrought iron B, which had a relatively low loss of weight, had deep pits, indicating that the corrosion attack on this material was localized.

Steel I, which had the greatest weight loss, likewise had the deepest pits. The general grouping of the other materials was very similar both as regards the loss of weight and the depth of pits.

TABLE VI.—DEPTH OF DEEPEST PITS (mils.)[a]

Exposure Period, months	Material A	Material B	Material C	Material D	Material E	Material F	Material G	Material H	Material I	Material J
6	26	29	none	none	27	25	22	24	26	19
12	36	27	16	none	30	25	25	29	43	30
18	40	28	—[b]	—[b]	37	31	40	26	—[b]	—[b]
24	36	51	19	23	35	24	33	31	40	27
30	35	42	—[b]	—[b]	25	29	22	23	—[b]	—[b]
36	55	65	17	28	45	35	39	38	56	32
42	30	42	none	none	29	29	21	32	56	31
48	54	57	30	none	52	45	54	35	54	50
54	40	55	—[b]	—[b]	45	30	55	47	—[b]	—[b]
60	48	64	42	35	48	51	47	39	68	42
72	53	64	34	61	47	64	52	46	72	53
84	51	109	34	61	56	56	55	46	68	46
120	76	70	—[b]	—[b]	54	81	61	74	—[b]	—[b]

[a] Based on results for one to five specimens; see Table II.
[b] A dash indicates that no specimen was exposed for that period.

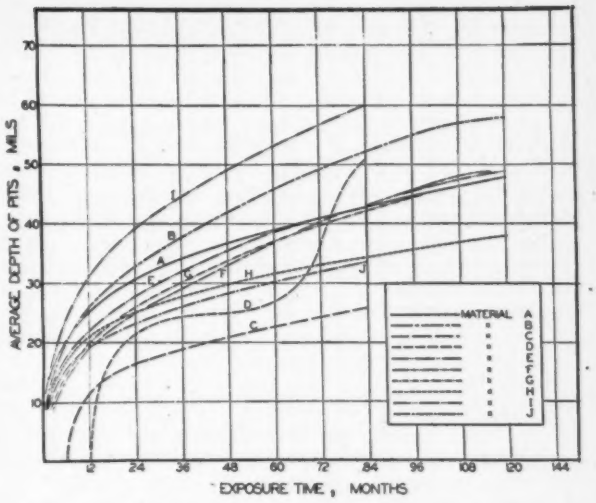

Fig. 3—Average Depts of Pits During the Test. The depth is the average of the 6 deepest pits for each specimen tested.

The depths of the deepest pits, Table VI, showed considerable variation even among specimens exposed for the same length of time. While the general trend was to show deeper pits with increased exposure time, there are numerous exceptions, particularly in the case of material A. One of the pits in a specimen exposed for 36 months was 65 mils deep. This depth was not approached again for this material until a specimen was examined after 60 months of exposure. After 84 months of exposure, one of the specimens contained a pit 109 mils deep, whereas the deepest pit measured after 120 months was 70 mils. This apparent wide scatter in results is due probably to either or both of two causes—(1) inadequacy of measurements, since but twenty pits were measured on each specimen, and (2) the localization of attack in favorable areas in certain specimens.

The average depths of the five deepest pits showed considerable less variation than the deepest pit measured for each material. This probably arises from the fact that the average of the five deepest pits in twenty measurements is subject to less variation than is the single measurement of the deepest individual pit (due to sampling material that is not perfectly homogeneous), Hence, the average depths of the five deepest pits out of twenty provide a more precise estimate of that parameter of pitting tendency than is obtained from the depth of the deepest pit.

Failure of any piping material in actual service usually results from perforation of the wall by pitting, with resultant leakage. It might be expected that the depth of the deepest pit would control the time required for a pipe to pit completely through, but no evidence was found to indicate that the deepest pit at any intermediate stage of the test would be necessarily the first to perforate. On the other hand, some evidence was obtained that pitting might be inhibited at times by the deposition of chemical compounds, or by the formation of corrosion products in the bottoms of the pits, thus preventing or slowing up subsequent attacks. Excluding the two cast irons, which had greater wall thicknesses than the wrought materials, the average depths of pits after 7 yr. of testing represented penetrations

of from 20 to 40 per cent of the wall thickness, whereas after 10 yr., the penetrations were from 25 to 36 per cent. It should be noted that one material, I, had deeper average penetration after its longest exposure period of 7 yr. than any of the materials which were tested for 10 yr. If the depths of the deepest pits are used as criteria, after 7 yr. of testing, again excluding the cast irons, the penetration of corrosion into the various materials ranged between 30 and 70 per cent, while those tested for 10 yr ranged from 36 to 52 per cent. Under these conditions a rough estimate of the minimum life of uncoated pipes of this type and for this kind of service would be about 15 yr.

Comparison of the average depths of pitting obtained in these tests with those obtained in other tests still under way at the National Bureau of Standards on actual service lines using the same water indicates that approximately 50 per cent greater corrosion occurred in the laboratory tests than in the service lines. This is probably due to the continuous flow of the water in the laboratory tests as compared with intermitten flow in the service lines. In the laboratory tests, the corrosion products are probably removed more rapidly than in the service lines; in the later the accumulation of corrosion products probably slows down the corrosion process to some extent.

At the end of the 10-yr. test, all of the samples contained corrosion products which occupied approximately one-fourth of the cross-sectional area of the pipes. Their hydraulic efficiency in regard to carrying water was undoubtedly very low under these conditions.

Summary

The results of the tests indicated that there was no great difference in the rates of corrosion of most of the wrought materials, when measured either by loss of weight or by depth of pitting. A low-alloy steel had the highest corrosion rate, while a copper-molybdenum ingot iron and a nickel-bearing wrough iron had the lowest rates. Other low-alloy materials, wrought irons, ingo iron and ordinary medium carbon steel pipes corroded at intermediate rates. Since all of the materials were tested in the uncoated condition, the pipes contained considerable corrosion products at the end of the test, which decreased their hydraulic efficiencies to a considerable extent. Estimated roughly from these tests the minimum length of life of these bare materials when subjected to continuous flow of Washington, D. C. water would be about 15 yr.

These tests, conducted under controlled laboratory conditions, indicated corrosion rates about twice as great as those in service lines at the National Bureau of Standards, on the basis of tests not yet completed.

Acknowledgment

The authors wish to acknowledge the valuable assistance rendered at various times by Mr. H. Babb, Miss Ellen Connelly, and Mrs. Phyllis C. Deming.

LITERATURE

American Management Assn., 330 West 42nd street, New York 18, N. Y. Booklet, "What's Your Management I.Q.?" compiled by Ellis H. Woolley, training supervisor, Naval Supply Depot, Oakland, Calif. Designed to enable executives, supervisors and foremen to appraise their knowledge of managerial principles and their ability to train and lead workers. Tests for knowledge of principles of organization, basis literature of management, methods of training and psychology of leadership. Also, "Self-Analysis Quiz for Supervisors and Executives" by Rexford Hersey, associate professor of industry, University of Penna., a longer test for higher-level supervisors, executives and those who aspire to such positions. Copies available for distribution to supervisors, executives and students at cost in quantity lots.

Cochrane Corp., 17th street & Allegheny avenue, Philadelphia 32, Pa. Bulletin, "CBA" Condensate Return System. In addition to material and operating specifications, capacity ratings are given for six sizes available —3, 5, 7½, 10, 15 and 25 h.p.—based on maximum of 200 p.s.i. pressure differential. Two-page dimensional drawing in color shows design and construction of unit.

Fibre Box Assn., 224 S. Michigan avenue, Chicago 4, Ill. Folder, "Fibre Box Memo 7." Devoted to uses, application and storage of gummed tape, with subheads on Sealing Fibre Boxes With Gummed Tape; Facts About the Storage of Gummed Tape; Your Tape Dispenser Needs Attention; How Gummed Tape Should Be Applied for Maximum Protection; Is the Tape Holding; and Are You Wasting Tape. Available through members of Association.

Frank Block & Associates, 809 Ambassador building, St. Louis, Mo., for Study Committee on Waste Paper Standards and Practices. Booklet, "Second Preliminary Report of the Study Committee on Waste Paper Standards and Practices." The joint Dealer-Mill Committee is offering this result of its unbiased mutual efforts in order to obtain the criticisms and suggestions of a more diversified group of participants. Chapters include Purchase Agreement, Fulfillment By Seller, Fulfillment By Buyer, Miscellaneous Practices, Arbitration, Grade Definitions, etc.

Hercules Powder Co., Wilmington, Del. Booklet, "Parlon, Hercules Chlorinated Rubber, Properties and Uses," revised edition. Includes technical information on general properties of product, describes uses in printing inks, protective coatings and textile finishes, as well as in paper coatings and other applications. Cover is coated with a Parlon-base lacquer to illustrate a relatively new use.

Manitowoc Shipbuilding Co., Manitowoc, Wis. Book, "Manitowoc." A picture record of the scope, equipment and products of the company's five divisions, shipbuilding, engineering, fabricating, equipment, manufacturing. Illustrated in Manitowoc Fabricating Works section is a massive drum barker, sulphite pulp digester, rotary digester for cooking straw and similar materials under pressure, heat exchanger for indirect cooking of wood pulp, heat exchanger for paper mill assembled in shop prior to shipment, and a two-section barking drum for a southern pulp mill.

Rapids-Standard Co., Inc., Dept. SB-250 Rapistan building, Grand Rapids 2, Mich. Bulletin, "Stevedore, Jr." Describes and illustrates the redesigned Stevedore, Jr., power belt conveyor. Contains action photograph of unit in 11-foot frame length size, explains various features and lists specifications of all models.

Republic Steel Corp., Massillon, Ohio. Booklet, "Republic Enduro Stainless Steel." Describes birth, growing pains, and coming-of-age of Enduro.

Shartle Bros. Machine Co., Middletown, Ohio. File Folder, "Miami Jordans," correspondence-file size. Inside covers picture and describe ten types of Miami Jordans. Back cover lists capacities of each. Separate brochures, individualized by color, are devoted to each type of Jordan.

U.S. Pulp Producers Assn., 122 East 42nd street, New York 17, N.Y. Book, "Wood Pulp Statistics, 1948 Edition." Contains all available official figures on capacity, production, imports, exports, new supply and consumption of wood pulp. A source of reliable information on trends of wood pulp supply and demand in the principal countries of the world for which such data are available. Price $5.

Edwin L. Wiegand Co., 7500 Thomas boulevard, Pittsburgh 8, Pa. Bulletin CS-601, "Chromalox, Electric Heat for Modern Industry." Specifications, standard ratings, lengths and prices are included with description of this electric radiant heater for glassless infrared drying, baking and heating.

Industrial Chemical Conference and Expo.

Coliseum, Chicago, October 12-16

CHICAGO—Latest developments, discoveries and applications in industrial chemistry will be disclosed October 12-16 when the Chicago Section of the American Chemical Society holds its fifth National Chemical Exposition and National Industrial Chemical Conference at the Coliseum.

Exhibit space has been assigned to more than 200 manufacturers and processors of chemical products, chemical machinery, precision instruments and scientific appliances.

Twenty-one technical papers, reporting on recent developments and findings in chemistry as applied to general industry, are scheduled for presentation at the conference, with noted authorities to lead the discussions.

Chemical Market Development will be discussed at the opening session of the Conference the evening of October 12. The program was planned and prepared by the Commercial Chemical Development Association, and is as follows: "Some Basic Aspects of Commercial Chemical Development," H. M. Corley, Armour & Co.; "A Case History of Commercial Chemical Development," D. K. Ballman, Dow Chemical Co.; "Use of Chemical Market Data," R. M. Prather, Standard Oil Co. (Ind.).

The general subject for the afternoon of October 13 will be *Chemistry in General Industry.*

Hazards from Chemicals will feature the program the evening of October 13, with Dr. R. M. Watrous of Abbott Laboratories speaking on "Health Hazards," Garrett B. James, Sr., of W. H. Markham & Co., talking on "Fire Prevention in the Chemical Industry" and R. C. Stratton, supervising chemical engineer of the Travelers Insurance Co., discussing "Disaster Prevention and Control."

The program for the afternoon of October 14 will be devoted to the general subject of *Industrial Research Management.* Paul V. D. Manning, International Minerals and Chemical Corporation, will speak on "Putting Research Results to Work."

Frontiers of Chemistry is the topic to be discussed Friday afternoon, October 15. R. C. Gunness, Standard Oil Co. (Ind.), will talk on "Synthetic Fuels"; L. B. Howard of the U.S. Department of Agriculture on "Chemistry in Agriculture"; E. H. Volwiler of the Abbott Laboratories on "Medicinal Chemicals"; and Farrington Daniels of the University of Wisconsin on "Nucleonics."

The general subject programmed for the evening of October 15 is *Pilot Plant Use by the Chemical Industry.* "Synthetic Organic Chemicals" will be the title of a paper to be presented by R. B. Semple of the Monsanto Chemical Co.; W. H. Engels of Merck & Co., Inc., will discourse on the "Development of Chemicals for the Pharmaceutical Industry"; and N. Fragen, Standard Oil Co. (Ind.), will discuss "Petroleum Products."

Dr. L. E. Clifcorn, exposition chairman, reports that contributions have come from all sections of the country for the exhibit of *Chemical Trail Blazers,* an educational, constructive and fascinating display in which awards are to be made for the most outstanding exhibit panels depicting new ideas, discoveries, developments and applications in industrial chemical progress. Chairman of the exhibit is R. R. Higgins.

A new feature this year will be the installation of the *Technical Bureau* as a help to small business men and manufacturers seeking knowledge of how chemistry can be applied to their production plans. It will be directed by Dr. Ward V. Evans, retired chairman chemistry department, Northwestern University, now professor of chemistry, Loyola University.

Arrangements for trips to industrial plants in the Chicago region can be made during the exposition at the Chicago Section Lounge—Booth No. 400.

Marcus W. Hinson, show manager, said the exposition will appeal to chemists, engineers, production managers, plant superintendents, foremen, purchasing agents, industrial executives and others eager to learn of new developments in the industry. Show headquarters are at 1505 South Wabash avenue.

Newsprint Research Laboratory

EASTON, Pa.—The American Newspaper Publishers Ass'n. will establish a laboratory here to help carry out an extensive mechanical research program on which it recently embarked, it was announced on August 18.

The laboratory probably will be housed on the second floor of a building to be erected in South Third street by Sidney Hochman. Plans call for 3,300 square feet of floor space in the laboratory, to be constructed especially to accommodate technical instruments and light testing machinery. Mr. Hochman said the laboratory will be ready in six months.

C. M. Flint of New York, mechanical research director of ANPA, will direct the laboratory's operations. He will maintain his offices in New York, but will supervise the activities of a technical staff which will live in this city.

The *Easton Express* will assist in the experiments to be conducted. J. Stackhouse, president of the Easton Publishing Co., publisher of *The Express,* is secretary of the ANPA and, as chairman of the association's mechanical committee, appointed the special mechanical research committee which developed plans for the program.

Projects listed under the laboratory's initial schedule include a program to determine those characteristics of newsprint which affect its surface conditions and degree of acceptance of ink, and hence its printability. Another research activity will be designed to put newspapers which run on one or two presses in a position to utilize new developments in the offset field. Other research will involve technical phases of newspaper work.

L. A. Observes "Paper Week"

LOS ANGELES — Paper and Paper Products Week will be observed here, beginning Sept. 19.

Paper mill men of Southern California are sponsoring the week during which retail stores will feature the display and sale of paper products. F. R. Ward, local representative of the Powell River Sales Corp., in making the announcement, pointed out that the paper industry is the fifth largest in the nation.

Miss Jean Gurrie, of Blake, Moffitt & Towne, has been named Miss Paper Products of 1948. She made an official call on Sheriff Biscailuz, who sold paper and stationery while in college.

St. Joe Acquires Woodlands

TALLAHASSEE, Fla. — According to deeds on file here, the St. Joe Paper Co. has acquired approximately 25,000 acres in Leon, Jefferson and Wakulla counties since January 1 for which more than $350,800 has been paid. Documentary stamps attached to the deed indicate that St. Joe paid $51,000 for property situated on the old St. Augustine Road east of the city (the twenty-fourth acquired). Informed sources said other sales have ranged from $100 to $81,800, the latter being the highest price paid for property by the paper firm in this county. The $81,800 deal was the sale of the George Henderson place, which is in the neighborhood of the Smith property.

Large Water Purchase

SAVANNAH, Ga.—Under terms of a contract just signed with the Industrial & Water Supply Commission the Union Bag & Paper Corp. will take a million gallons of water a day from the water system. The contract gives Union Bag an option for three years on six million gallons per day.

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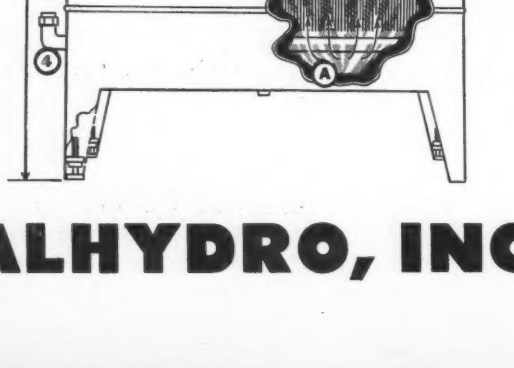

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2. Alternate Stainless Steel and Aluminum Plates.
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4. Water Feed Line easily removed for inspection.

A. Water enters tank through slots in feed pipe.

B. Concentrated floc is carried to top and leaves through discharge trough.

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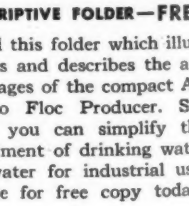

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SECTION OF THE

TECHNICAL ASSOCIATION
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122 E. 42nd ST., NEW YORK 17, N. Y. Edited By R. G. MACDONALD, Secretary

An Accelerated Method for Measuring the Penetration of Water in Insulation Board*

By Willmer A. Wink[1] and J. A. Van den Akker[2]

Abstract

The present work is an outgrowth of a previously reported investigation of the penetration of liquid water *in insulation board. It had been shown that a moderate elevation of the temperature appreciably increased the penetration rate; this has been taken as the basis for an accelerated method. The laboratory manipulations have been simplified, and improved means for determining the degree of penetration of water have been developed. Penetration data for samples of insulation board supplied by eleven manufacturers were obtained at 100, 120, and 130° F. In every case, it was found that the new method for measuring the degree of penetration agreed with data on the distribution of water in the board. A large accelerating factor was found at 130° F., and the relative ranking of samples with regard to resistance to penetration of water at that temperature was observed to be substantially the same as that existing at 100 and 120° F.; in the case of the five samples having the least resistance to penetration, the ranking was the same at these three temperatures. An accelerated mill control test is proposed.*

In a previous publication *(1)*, the results of an investigation of the existing dry-indicator test for the water resistance of insulation board were presented, and a new method for determining the penetration of *liquid water* was presented with data obtained with the new method. The purpose of the present work is the development of a method which could be utilized by the industry as a control test for the rapid determination of the penetration of water in insulation board.

The improved method employed in the earlier work enables one to measure directly the distance of penetration of water in the board. Briefly described, a surface of the board was placed in contact with water for a predetermined period of time and the moisture contents of different layers in the test specimen were measured. The layers, separated by a fast cutting operation, were considered to have been penetrated by water if their moisture content was equal to, or greater than, the fiber-saturation point of the material at the given temperature (73 or 100° F.).

When the samples of insulation board sheathing submitted by eleven manufacturers were tested in accordance with the foregoing procedure, it was found that the samples had to be left in contact with water for an appreciable period of time for penetration to occur. At *73° F.*, there was no evidence of penetration of water in any of the samples following a 24-hour exposure time. Two of the samples (Nos. 6 and 7), which could be considered as having a poor water-resistant barrier, withstood a 48-hour exposure to water without penetration having occurred. At *100° F.*, the penetration of water was greatly accelerated, having occurred in both samples 6 and 7 in about 20 hours. For this exposure time, the depth of penetration in sample 6 was found to be approximately half the thickness of the board; that in sample 7 was somewhat less, being of the order of ⅛ inch. These observations on the penetration of water in insulation board sheathing clearly indicated that the problem of developing a mill control test is primarily one of establishing conditions that would greatly accelerate the rate of penetration of water into the board. Accordingly, it appeared that this could be accomplished only by conducting the penetration tests at higher temperatures. [Acceleration of liquid permeability testing of a porous medium by means of elevated pressure differential is considered by the authors as invalidated by the consideration that a pressure differential will overcome capillary forces established by hydrophobic (i.e., water-resistant) surfaces in the medium.]

Method of Investigation

In the development of an accelerated method for measuring the water resistance of insulation board, the effect of temperature on the penetration rates was investigated for three different temperatures — namely, 100, 120, and 130° F. Specimens of the board were exposed to water for varying periods of time to establish the approximate time required for penetration to occur at each of the designated temperatures. The method employed for determining the depth of penetration of water in the board was a modification of that previously described *(1)*. The essential changes in the method involved the manner in which the layers were dried to obtain their moisture content. Instead of drying the specimens in an oven, a procedure that required a considerable period of time, the specimens were dried on an electric hot plate. Before utilizing the hot plate as a part of the procedure, however, tests were made with it to determine the drying rates for the different samples and thus to establish the minimal time required to dry the board to constant weight.

During the course of this work, another technique for judging the depth of penetration of water in insulation board was examined. In using this technique, a

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[2] Research Associate, The Institute of Paper Chemistry, Appleton, Wis.

fluorescent dye was applied to the *edges* of the freshly cut sections of the specimens after the specimens had been in contact with water, and then the edges were visually inspected to see whether or not penetration had occurred. If this method agreed favorably with the one in which the penetration of water was measured by determining the moisture content of the layers in the specimen, then it could be used in a mill control test, *thus eliminating the time required for the moisture content measurements*. The dye employed was Uranine "B" (Heller and Merz) which is currently used in a water penetration test for sized papers *(2)*. When dissolved in water, this dye has the property of fluorescing with a brilliant yellow light when exposed to ultraviolet light. A noteworthy characteristic of this dye is its property of fluorescing brilliantly only when it is in a dilute solution; it will not fluoresce appreciably when it is damp or in a concentrated solution.

Apparatus

To facilitate the penetration measurements at the three different temperatures, the constant temperature water bath shown in Fig. 1 was constructed. The main body of the bath consisted of a 20-gage galvanized iron tank, 32 inches long, 26 inches wide, and 12 inches high. To minimize heat losses, the bath was insulated by covering the outer surface with several thicknesses of corrugated board. (If a bath of this type were to be used for an extended period of time, as it would be in mill control testing, the bath should be constructed of a noncorrodible material such as stainless steel or copper.) To provide a means for holding the specimens in a fixed position in the tank, a reinforced plate (also constructed of galvanized iron) containing six round sample openings (7⅛ inch diameter) was used. This plate was mounted 2 inches below the top edge of the tank. The sample openings were slightly larger than the specimens so that a specimen containing a wax-sealed edge would conveniently fit into the opening. Each sample opening was equipped with three L-shaped wire holders, upon which the specimen rested while the test was in progress. These brackets extended below the surface of the plate ½ inch. The water level of the bath was adjusted so that the lower surface of the specimen was immersed in the water to a depth of ⅛ inch.

In order to maintain a constant and uniform temperature of the water throughout the bath, it was provided with an electrically driven stirrer (*a*), a 500-watt knife type heater (*b*), and a merc-to-platinum thermoregulator (*c*). The thermoregulator, operating through a relay (Precision Scientific Co.), controlled the on-off cycle of the knife heater and maintained the bath at the desired temperatures.

In preliminary experiments with the bath, it was found that condensation occurred in the central portion of the specimens when they were left in contact with the water (which was above the temperature of the room) for an extended period of time. To eliminate the condensation, which would otherwise affect the penetration measurements, it was necessary to heat the air space above the specimens to the same or a slightly higher temperature than that of the bath. To accomplish this, a heating element consisting of approximately 130 feet of No. 26 Nichrome wire was mounted to a cover piece of insulation board in the form of a grid and placed over the bath. The wire was fastened directly to the board, allowing a space of ½ inch between parallel wires. The calculated capacity of the heater was about 36 watts.

When the bath was maintained at a temperature of either 120° or 130° F., the desired temperature in the air space was maintained by connecting the element directly to a 115-volt a.c. line. However, when the bath was maintained at a temperature of 100° F., it was necessary to lower the voltage supplied to the element to approximately 88 volts. For the experiments in this report, the temperature of the air space above the specimens was maintained about 1 to 2° F. above the temperature of the bath.

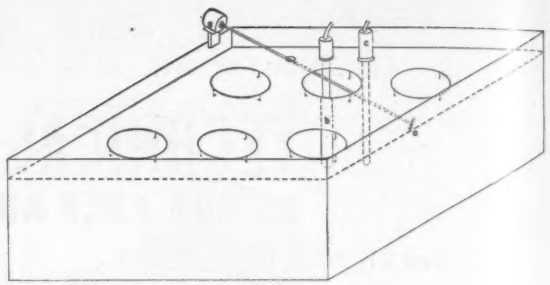

FIG. 1

In a penetration test where the specimens would be in contact with the water for a relatively short period of time—e.g., for a period of about 2 hours—the insulated cover containing the heating element would not be needed. The amount of moisture that would condense in the board during a short exposure would not give rise to serious errors in the penetration measurements.

Determination of Drying Rates to Establish Minimal Time Required to Dry Specimens to Constant Weight

In order to reduce the over-all testing time required for the moisture content determination of the layers in the penetration test, an electric hot plate was used, instead of the oven, to dry the specimens to a constant weight. (Drying the specimens in an oven requires an elapsed time of more than 24 hours.) The hot plate employed in this study was designed for use in paper mill laboratories for the drying of pulp handsheets and is manufactured by the Noble and Wood Machine Co., Hoosick Falls, New York. The Noble and Wood hot plate has an electrically heated curved surface against which the specimens are held in intimate contact by means of a coarse wire screen.

To determine the minimal time required to dry the specimens to a constant weight on the hot plate, drying rates were obtained for each of the samples employed in this study. Specimens of board, ⅛ inch thick, were obtained from the central portion of the board, soaked in water for a period of 48 hours, and placed on the hot plate having a surface temperature of approximately 275° F. Following a 20-minute interval, the specimens were weighed, at about 10-minute intervals, until constant weight was observed. The specimens were weighed in an electrically heated analytical balance, which is ordinarily used for quickly obtaining the ovendry weight of pulp handsheets.

The drying rates, established with the hot plate in the foregoing manner, indicated that all the samples could be dried to a constant weight in 30 to 40 minutes when the thickness of the specimen was limited to ⅛ inch.

Details of Testing Procedure

The detailed procedure for studying the penetration of water in insulation board at the three different temperatures is given in this section. Some of the details of this procedure are the same, in many respects, as those previously described *(1)* and may appear repetitious.

However, in the interest of continuity and for the convenience of the reader, these details will be repeated.

Using a band saw, the specimens were cut from the panels of board in the form of disks having a diameter of 6¾ inches. *Disks were used in the laboratory experiments; for a mill control test it may be more convenient to cut the specimens in the form of a square.* To prevent the water from entering the edges of the specimens, they were sealed with wax (50% rosin, 50% beeswax) employing the template shown in Fig. 2. (Although a mixture of 50% rosin and 50% beeswax was used in these experiments, it is recommended that a high melting point microcrystalline wax, obtainable from the Bareco Oil Co., Tulsa, Okla., be employed in a mill control test at the highest temperature.) This template was constructed from a piece of boiler plate, 1¼ inches thick, on a machinist lathe. After applying a thin film of grease to the template, to prevent the wax from sticking, the specimens were centered in the recess, as shown in the figure. An inverted crystallizing dish having the same diameter as the specimen and a weight were successively placed over the specimen. The inverted crystallizing dish prevented the wax from flowing out over the top surface of a specimen. By means of a pipet (50 ml.) equipped with a rubber bulb, the wax was transferred to the groove formed by the specimen and the template. After allowing a few minutes for the wax to solidify (but while it was still warm), the weight and the crystallizing dish were removed. A spatula was run around the top of the specimen (while in the template) to remove the excess

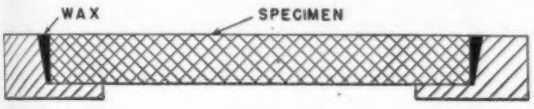

FIG. 2

wax. Following an additional brief cooling period, the specimen was removed from the template. If attempts are made to remove the specimen before the wax has cooled sufficiently, some difficulty will be encountered. (For mill control testing, it may be desirable to seal the edge of the specimens by dipping the edges in a bath of hot wax, instead of using the template.)

The specimens prepared in the foregoing manner were subsequently placed in the constant temperature bath in such manner that the upper surfaces (those surfaces of the specimen that faced upward in the template while the wax seal was made) were in contact with the water. Following a predetermined exposure time, the specimens were removed from the bath and sectioned in accordance with the schematic diagrams shown in Figs. 3 and 4. To accomplish this a power-driven saw and a band saw were employed. The first pass through the power saw removed the section designated *a*, the second and third passes removed sections *b* and *c*, respectively, and the fourth pass removed section *e*. Section *d*, which had been cut to be about 4½ inches long and 1 inch wide, was transferred to the band saw where the two layers were cut for the moisture content determination. The layers were cut as shown in Fig. 4 with the aid of a simple guide. The guide consisted of a straight-edged piece of wood, attached to the table of the saw with a C-clamp, and adjusted to provide a ⅛-inch clearance between it and the saw. For the first pass through the band saw, a shim was interposed between the specimen and the saw so that only 3/32 inch of the material (including the saw cut) was removed from the specimen. The cut was made parallel to the surfaces of the board and removed the water barrier (the one that had been in contact with the water) which would otherwise interfere with the subsequent moisture content determinations. The two succeeding passes through the saw (without the shim) produced the layers for the moisture content determination. Immediately after cutting, the layers were placed in tared weighing bottles and weighed on an analytical balance. Following this, the layers were successively removed from the weighing bottles, placed on the hot plate for a period of one hour, restored to their respective bottles, and weighed again. The moisture content was calculated on the basis of the dry weight of the specimen.

For the visual examination and direct measurement of the penetration of water in the insulation board, the sections *a* and *e* (Fig. 3) were employed. Immediately after the layers of section *d* were placed in the weighing bottles, the Uranine "B" dye was sprinkled on the edges of sections *a* and *e*, which were originally adjacent to section *d*. The dye was applied from a bottle (similar to a salt or pepper shaker), the cap of which had an opening covered with a fine screen (80-100 mesh). *A very light application of the dye is used;* the amount used is just visually detectable in daylight. Because of the hygroscopic nature of the Uranine "B" dye, the bottle of dye, when not being used, should be stored in a dry atmosphere such as that in a desiccator containing anhydrous calcium chloride. After application of the dye, the edges were examined under an ultraviolet lamp (Mazda BH-4) for evidence of water penetration as judged by the characteristic yellow fluorescence of the dye. If a specimen was encountered in which penetration occurred, the depth of the penetration was measured with a rule and recorded, together with other pertinent information concerning the nature of the observed wet regions in the sections. *The whole process of visual examination by means of the fluorescence technique is carried out in a number of seconds after performing the saw cuts.*

The nature of some of the materials tested was such that the fluorescence technique was unnecessary; penetration could be seen by distinct darkening of wet regions.

The results obtained in studying the penetration of water in the eleven samples of insulation board at three different temperatures are presented in Table I. The

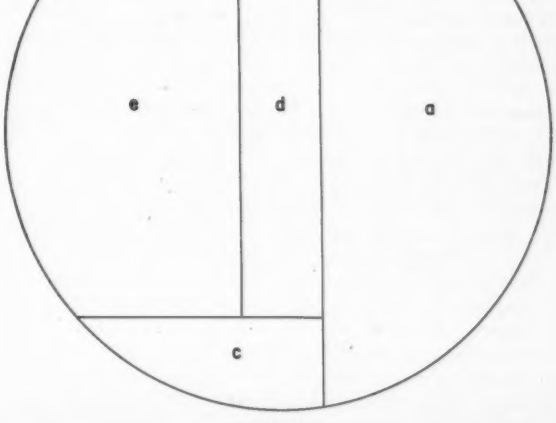

FIG. 3

FIG. 4

samples used in this study were comprised of the remaining panels of insulation board sheathing that were originally submitted for the first phase of the program by the eleven manufacturers.

Referring to Table I, the first column designates the sample number [samples bear the same code numbers as used in the previous article *(1)*]: the second, the period of time the specimens were exposed to the water; the third, the moisture content of the first ⅛-inch layer away from the surface of the specimen that was in contact with water; the fourth, moisture content of the second ⅛-inch layer away from the surface of the specimen that was in contact with water; the fifth, the equilibrium moisture content of the sample at 100% R.H. and 100° F. (these values were taken from the previous work). The last two columns present information on the penetration data obtained by using the Uranine "B" dye. Column six designates the nature of the observed penetration. If the water penetrated the board uniformly, the letter U is employed to designate this fact and the depth of the observed penetration is presented in the last column by a single value. When penetration occurred at all points of the board but to an irregular depth, (for example, ¼ inch at one end of the specimen and ½ inch at the other end) the letter U is still employed, but two values appear in the last column to indicate the range of the observed depth of penetration.

The letter S in the sixth column denotes the fact that penetration occurred in a spotty manner at one or several isolated points in the specimen. This would be the case, for example, if the water entered the board through a pinhole or several adjacent pinholes. The maximum depth of penetration for each of the wet spots observed in the two cross sections is presented in the last column. If a single wet spot was observed, one value appears in the column, if two were observed, then two values appear, etc.

Comparison of Results Obtained in Evaluation of Penetration by Two Different Methods

A critical examination of the penetration data presented in Table I indicates that good agreement exists between those values obtained by measuring the penetration of water in insulation board as a function of the moisture content (MC method) and those obtained by judging and measuring the penetration with the fluorescent dye (F method). In every case, the presence of absence of water in the test specimen, as judged by fluorescence of the dye, was substantiated by the moisture content of the layers. From these observations, it could be concluded that the F method could be used reliably for the purpose of detecting and measuring the penetration of water in insulation board.

In a mill control test, the F method would have a number of outstanding advantages over the MC method. In addition to being a direct method for measuring the penetration, it would also be a rapid method. The time required to ascertain whether or not penetration had occurred in a specimen (exclusive of the time the specimen was in contact with water) would be the elapsed time required to section the specimen and apply the dye. If a means for cutting the specimen is located near the bath, this entire operation would involve less than a minute.

With the F method, pertinent information is obtained regarding the nature of the failure in the water-resistant barriers employed on the board. Whether penetration occurred as a result of pinholes in the barrier, or was a general failure of the material comprising the barrier, is information which is of interest and value to the manufacturer.

During the course of the study of the F method, it was observed that, for most of the samples in which penetration occurred, the wet areas in the cross section of the specimens could be seen before the dye was applied. The color of the wet material in such samples was appreciably different from that of the dry material. However, for a few of the samples, the color of the wet and dry material was so nearly the same that detection of a wet area would have been missed without application of the dye. If the F method is adopted as a mill control test, it is strongly recommended that each manufacturer employ the dye until it has been found that the dye would not be needed.

A characteristic of the Uranine "B" dye that would

TABLE I.—PENETRATION OF WATER IN INSULATION BOARD SHEATHING

(Temperature of Water Bath 100° F.)

Sample	Time, hr.	Moisture Content, First Layer	Moisture Content, Second Layer	Fiber Saturation Point at 100° F.	Type of Failure	Depth of Penetration, in.
1	48	50.0	19.5	34.4	S	1/4
1	48	59.5	31.7	34.4	S	1/4
1	72	31.4	17.6	34.4	S	3/16, 3/16, 1/16
1	72	93.5	102	34.4	U	7/16-5/8
6	6	56.4	11.6	37.0	U	1/16-3/32
6	6	60.0	11.3	37.0	U	1/16-1/8
6	12	102	12.3	37.0	U	3/32-1/8
6	12	122	12.6	37.0	U	1/8
7	24	34.7	11.1	33.0	U	1/16
7	24	28.0	10.9	33.0	S	1/16, 3/16
7	48	137	153	33.0	U	11/16
7	48	137	150	33.0	U	11/16
8	24	28.6	15.2	35.5	S	1/4, 1/8
8	24	24.6	15.3	35.5	S	1/8, 1/4
8	48	118	80.4	35.5	U	3/8
8	48	32.9	17.7	35.5	S	1/8, 1/4
10	72	24.6	19.8	46.2	..	0
10	72	25.8	20.8	46.2	..	0

(Temperature of Water Bath 120° F.)

1	6	47.7	15.0	34.4*	S	3/16, 1/32, 1/32
1	6	11.7	7.9	34.4*	..	0
1	12	23.2	14.1	34.4*	S	7/16, 1/8, 1/8
1	12	84.5	45.9	34.4*	S	3/8, 1/4
1	24	119	126	34.4*	U	9/16
1	24	96.1	76.7	34.4*	U	1/4-1/2
1	48	127	134	34.4*	U	Complete
1	48	84.6	88.9	34.4*	U	3/4
1	72	99.0	102	34.4*	U	1/2-3/4
1	72	114	114	34.4*	U	11/16
2	72	14.8	12.1	33.0*	..	0
2	72	13.0	10.8	33.0	..	0
3	72	18.7	12.7	40.8*	..	0
3	72	16.1	11.7	40.8	..	0
4	72	11.6	9.6	34.8*		0
4	72	11.7	9.9	34.8	..	0
5	72	7.9	7.6	35.4*	..	0
5	72	11.0	9.3	35.4	..	0
6	¼	10.6		37.0*	U	1/16
6	¼	19.1		37.0*	S	1/32, 1/32
6	½	336		37.0*	U	5/16
6	½	343	338	37.0*	U	11/16
6	¾			37.0*	U	Complete
7	⅛	10.9		33.0*	..	0
7	1⅛	12.1		33.0*	..	0
7	2⅛	17.2		33.0*	U	1/16
7	2¾	37.9		33.0*	S	1/8, 1/8
7	2¾	28.2		33.0*	S	1/8, 1/8
7	3	47.8		33.0*	S	3/16, 3/16
7	3	38.9		33.0*	S	3/16, 3/16
8	6	33.8	10.8	35.5*	S	1/4, 1/4, 1/8
8	6	159	97.5	35.5*	U	1/4-7/16
8	12	135	101	35.5*	U	1/8-5/8, 1/4-1/2
8	12	125	84.5	35.5*	U	1/4-1/2, 1/8-1/2
8	24	308	277	35.5*	U	Complete
8	24	319	287	35.5*	U	Complete
8	48	27.5	17.1	35.5*	S	3/8
8	48	220	208	35.5*	U	Complete
8	72	265	267	35.5*	U	Complete
8	72	93.2	75.6	35.5*	U	0-5/8
9	72	12.4	10.9	38.2*	..	0
9	72	23.2	18.6	38.2*	S	1/2, 1/4

10	24	18.6	16.1	46.2°	..	0
10	24	18.1	16.7	46.2°	..	0
10	48	17.5	14.0	46.2°	S	1/4, 1/4
10	48	220	192	46.2°	U	1/2
10	72	28.2	20.1	46.2°	S	1/4, 1/4, 1/4
10	72	228	220	46.2°	U	1/2
11	72	7.7	7.6	27.8°	..	0
11	72	8.2	7.8	27.8	..	0

(Temperature of Water Bath 130° F.)

1	6	72.5	39.4	34.4°	S	1/4, 5/16
1	6	63.8	31.9	34.4°	S	1/4, 1/8, 1/2, 1/4
1	12	66.5	41.6	34.4°	S	7/16, 3/8, 3/8
1	12	72.1	60.3	34.4°	S	11/16, 11/16
1	24	167	210	34.4°	U	Complete
1	24	185	231	34.4°	U	Complete
1	24	12.0	9.4	34.4°	..	0
1	48	129	141	34.4°	U	13/16
2	72	8.8	7.9	33.0°	..	0
2	72	8.3	7.3	33.0	..	0
3	48	14.7	10.5	40.8°	..	0
3	48	15.7	11.8	40.8°	..	0
3	72	65.8	87.5	40.8°	S	5/8, 1/2
3	72	41.2	34.5	40.8°	S	9/16, 1/2
4	72	11.2	9.8	34.8°	..	0
4	72	12.6	10.9	34.8	..	0
5	72	57.2	51.7	35.4°	S	5/8
5	72	10.0	9.2	35.4	..	0
6	1/12	6.7	5.3	37.0°	U	1/32
6	1/12	216	22.0	37.0	U	1/8-1/4
6	¼	334	303	37.0°	U	1/4-9/16
6	¼	351	338	37.0	U	Complete
7	1	27.5	7.8	33.0°	U	1/32
7	1	20.8	7.7	33.0°	U	1/32
7	1½	100.0	18.6	33.0°	U	1/8
7	1½	68.0	10.4	33.0°	U	1/8
8	2	11.6	7.8	35.5°	S	1/8, 1/8
8	2	101	16.9	35.5°	S	3/16, 1/4
8	4	54.3	26.9	35.5°	S	1/4, 1/4
8	4	179	116	35.5°	U	3/16-5/8
8	12	323	286	35.5°	U	Complete
8	12	340	316	35.5°	U	Complete
8	24	353	349	35.5°	U	Complete
8	24	354	354	35.5°	U	Complete
9	72	12.1	11.1	38.2	..	0
9	72	11.8	10.5	38.2	..	0
10	12	11.4	10.3	46.2°	S	1/4
10	12	44.7	32.6	46.2°	S	7/16
10	24	17.1	14.9	46.2°	S	1/4
10	24	313	308	46.2°	U	Complete
10	24	312	302	46.2°	U	Complete
10	48	157	152	46.2°	U	7/16
11	72	8.1	7.5	27.8°	..	0
11	72	7.6	7.3	27.8	..	0

These values were taken from the earlier work(1)* and represent the equilibrium moisture content of the samples at 100% R.H. and 100° F. They are presented for the reader's convenience to enable a quick comparison between the moisture content of the layers and the fiber saturation point. The equilibrium moisture contents were not determined at temperatures of 120° and 130° F. For the two higher temperatures, the equilibrium moisture content or the fiber-saturation point would tend to be somewhat lower than the values presented for 100° F.

be of interest and may be found quite useful in a mill control test, is its ability to fluoresce in the dry state, after it has been wet with water while in contact with a cellulosic material. Thus, the test specimens of insulation board could be stored and inspected for evidence of penetration any time after application of the dye, even though the specimen and dye had been permitted to dry. Stored dry layers cut parallel to the dyed edge would enable one to build up a file of material records.

Effect of Temperature on the Penetration Rates

A comparison of the penetration rates at all three temperatures could be made only for four of the eleven samples. These samples (1, 6, 7, and 8) were the only ones in which the penetration of water occurred at all of the temperatures within a 72-hour period. Of the remaining seven samples, three samples (2, 4, and 11) showed no evidence of water penetration at any of the temperatures after being in contact with the water for 72 hours, and four of the samples (3, 5, 9, and 10) showed that penetration had occurred at either 120 or 130° F.

In a qualitative evaluation of the penetration rates obtained for samples 1, 6, 7, and 8, at the three temperatures, an attempt was made to establish the time required for the water to penetrate the specimens to a depth of

TABLE II.—TIME REQUIRED FOR WATER TO PENETRATE TO A DEPTH OF ⅛-¼ INCH

Sample	100° F.	120° F.	130° F.
1	48 hr.	12 hr.	3 hr.
6	12 hr.	20 min.	5 min.
7	30 hr.	3 hr.	2 hr.
8	36 hr.	6 hr.	2 hr.

⅛ to ¼ inch. When this was done, the data presented in Table II were obtained.

Upon examination of the data presented in Table II, it will be observed that the penetration of water in insulation board can be greatly accelerated by increasing the temperature of the water. The observed increase in the penetration rates for three of the samples—namely, 1, 7, and 8—are in fair agreement. Average values of the penetration times for these samples indicate that a 1-hour exposure at 130° F. is equivalent to an exposure of 3 hours at 120° F. and to 16 hours at 100° F.

The accelerating effect of temperature on the penetration in sample 6 is appreciably greater than that observed for the other three samples. The reason for the rapid increase in the penetration rate with temperature for this sample is not known. It is possible that the characteristics of the material employed as a waterproofing agent in this board were more temperature sensitive. When using the same basis of comparison as before, an exposure of one hour at 130° F. for sample 6 is equivalent to an exposure of 4 hours at 120° F., and to 144 hours at 100° F.

In setting up a method for an accelerated mill control test, it would be preferable to use the penetration results obtained for samples 1, 7, and 8 as a standard. The accelerating factor based on these results would tend to place the test results that are obtained under accelerated conditions well on the conservative side. For example, if a sample of board were exposed to water for a period of one hour at 130° F. and no penetration was

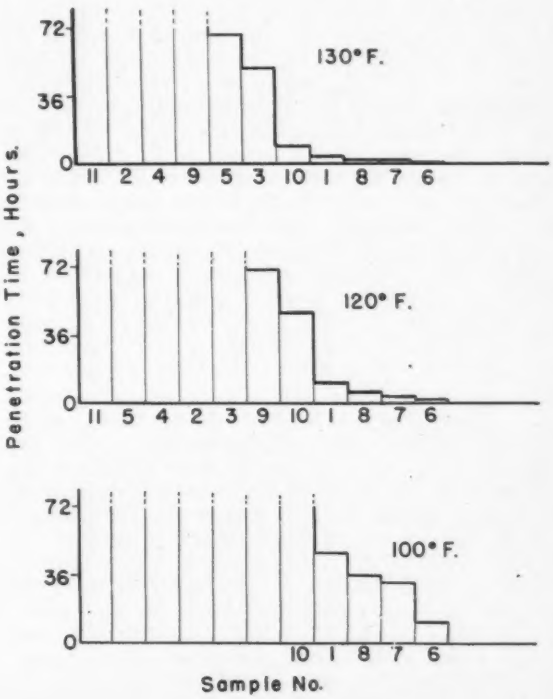

FIG. 5

observed at the end of this time, it would be safe to assume that the same board would successfully withstand a 16-hour exposure to water at 100° F.

Ranking of Samples at Temperatures of 100, 120, and 130° F.

An important aspect of the investigation leading to the development of an accelerated method for measuring the water penetration in insulation board sheathing concerns the relative ranking of the samples at the three different temperatures. If the water-resistant barriers employed on the boards were seriously affected by temperatures, a misranking of the samples could be expected as the temperature of the water was raised to a higher value. For the boards having an asphalt barrier, the higher temperatures might possibly favor "healing" of pinholes and, as a result, penetration that occurred at the lower temperature would not occur at the high temperature. For the boards which did not have an asphalt barrier, but were treated with some other material for the purpose of imparting water resistance, the penetration of water into the board might be adversely affected as the temperature of the water was increased. For example, the material might melt at the higher temperatures. Thus, the observed penetration rates associated with an increase in temperature would be much greater than could be attributed to the lowered viscosity of the water.

The relative rankings obtained for the eleven samples at the three different temperatures are presented in the charts of Fig. 5. The samples are ranked in descending order reading from left to right—i.e., a sample that was found to be the most impervious to water was placed in the left position of the chart and the one that was found to be the most pervious to water was placed at the right end of the chart. For the samples in which penetration occurred within a 72-hour exposure time, the position of the sample was determined on the basis of the time required for penetration to occur. The height of the bar for such samples indicates the approximate penetration time (⅛ to ¼ inch). For the samples in which the penetration of water did not occur within the 72-hour period, the relative position of the samples was determined on the basis of the moisture content of the first layer of the test specimens, after the specimens were in contact with water for a period of 72 hours. The height of the bar for these samples extends to the top of the chart and ends with the broken line to indicate that a longer exposure would have been necessary for penetration to occur. The samples that are omitted in the lower chart were not tested at a temperature of 100° F.; these samples, it will be noted, were not penetrated appreciably by water at the two higher temperatures and, consequently, little information would have been gained by testing them at the lower temperature.

Upon examination of the charts, it will be observed that, in general, the agreement of relative ranking of the samples at the three different temperatures is good. The small inversions in the ranking of those samples whose positions were determined by the moisture content in the first layer is not serious because their position depended upon the *water-vapor* resistance rather than the water resistance of the barriers employed on the boards. For the samples of board in which the penetration of water did occur, the samples are ranked in exactly the same order, which is indeed promising. On the basis of these results, it would appear that elevated temperatures could be successfully employed in a mill control test as a means for accelerating the water penetration rates in insulation board sheathing.

Proposed Method for Accelerated Mill Control Test

The following method is suggested for an accelerated mill control test for measuring the penetration of water in insulation board sheathing. It is anticipated that modifications may be necessary in order that the procedure will conform with the time and temperature requirements of current specifications.

1. The test specimens should be cut from the panels of board in the form of a disk having a minimum diameter of not less than 6 inches, or in the form of a square having minimum dimensions of not less than 6 inches on a side. The edges of the test specimens should be sealed with wax, using a template similar to the one shown in Fig. 1, or they should be sealed by dipping the edges in a bath of hot wax. Excess wax should be trimmed from that face of the specimens which will contact the water, so that the water can have free access to that face.

2. The specimens should be tested by placing them in contact with water contained in a constant temperature bath which is designed to provide a constant and uniform temperature of 130 + 0.5° F. The lower surface of the specimen should be immersed in the water to a depth of ⅛ inch. If the specimens are to remain in contact with the water for a period of more than 2 hours, the bath should be provided with facilities for heating the air space above the specimens as described in an earlier section of this article.

3. Following a predetermined exposure of the test specimens to the water (this will depend upon the requirements to be met in specifications)—for example, a period of one hour—the specimens should be removed from the bath and sectioned immediately with a power saw so that four pieces are obtained by two passes through the saw. The two saw cuts should pass through the center of the specimen and should be made at right angles to each other.

4. Following a light application of the Uranine "B" dye (as described in this paper) to the freshly cut edges, the specimens should be removed to a darkened room or shaded space and examined under an ultraviolet lamp to determine whether or not penetration of water occurred in the specimen. If penetration occurred, as judged by the bright yellow fluorescence of the dye, the depth of the penetration should be measured to the nearest 1/16 inch and recorded. It is suggested that a depth of a definite fraction of one inch be used as a standard upon which judgment of a sample may be based. If, for example, the water penetrated the specimen to a depth of less than that distance, the sample would be considered satisfactory. If, in accordance with the discussion of an earlier section of this report, it is found that the dye is not needed for differentiating between the wet and the dry material in the samples, it may be desirable to dispense with the use of the dye. The measurement of the depth of penetration of water without the dye should be made in the same manner as that described above. However, the use of the dye enables the manufacturer to file the material records of the water resistance of his products.

Acknowledgment

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TAPPI Fundamental Research Conference Madison, Wis., August 18–20, 1948

The second in the series of fall meetings of the Technical Association of the Pulp and Paper Industry was held at the Forest Products Laboratory and the University of Wisconsin, Madison, Wisconsin on August 18-20, 1948. About 170 attended. The meeting was sponsored by the TAPPI Fundamental Research Committee of which Harry F. Lewis of the Institute of Paper Chemistry is Chairman. Alfred J. Stamm and George J. Ritter of the Forest Products Laboratory handled the local arrangements and Dr. Stamm was general Chairman of the conference. The out of town attendants at the meeting were housed in the University of Wisconsin dormitories.

The general theme of the conference was "The Physical Properties of the Components of Wood". G. A. Hunt, Director of the Forest Products Laboratory welcomed the group to the Laboratory and commended the Association for giving consideration to the fundamental theme of the meeting.

Dr. Lewis in his introductory remarks outlined the progress made in the two preceding annual conferences at Detroit and Appleton and indicated that considerable progress will be made in the papermaking processes when better knowledge of fundamental principles are known. Already considerable progress has been made in the substitution of a wide variety of woods to supplement the diminishing supply of woods formerly used.

During the conference six fundamental phases of the physical chemistry of wood and its components were covered in review presentations by specialists, followed by a thorough discussion of each subject led by other specialists.

Meetings of Wednesday August 18

Since the presentations and discussions will be published in full at a later date relatively few details will be given in this report.

The first subject presented was on the "Microstructure of Wood and Wood Components" by George J. Ritter, Forest Products Laboratory. The discussion was led by Thomas Kerr of the North Carolina Agricultural Experiment Station. Among the points brought out by Dr. Ritter were the following: Fibers do not swell lengthwise. Ray cells are not fibers and swell lengthwise but not in the cross direction. The radial walls of fibers and ray cells contain many pits. This presentation as well as the following required about three hours, including the discussion.

In the afternoon Herman Mark of the Polytechnic Institute of Brooklyn reviewed the "Submicroscopic Structure of Wood and Cellulose". The principal discussor was W. A. Sisson of the American Viscose Company. Dr. Mark indicated that the cellulose fiber was generally about 60 per cent crystalline and 40 per cent amorphous. The latter is important because of its reactivity to dyes, etc. and in contributing important properties to pulp and paper.

On Monday evening a banquet was held in Kronshage Hall at the University of Wisconsin at which A. J. Stamm presided. In addition to an enjoyable barbershop quartette program, Dr. Stamm introduced the foreign visitors present. These included Dr. and Mrs. Holger Erdtman of the Royal Institute of Technology in Stockholm, Sweden; Jean Istas, Research Laboratories, Ministry of Colonies, Belgium; and W. G. Campbell, Forest Products Laboratories, Princes Risborough, England.

Meetings of Thursday, August 19th

W. B. Campbell of the Pulp and Paper Research Institute of Canada discussed "Wood and Fiber-Liquid Relationship". In his talk, Dr. Campbell outlined the various methods of measuring fiber surfaces including the microscopic, silvering procedure, and permeability methods. A discussion of his talk was led by L. V. Forman of the Institute of Paper Chemistry.

In the afternoon, A. J. Stamm reviewed information on "The Passage of Materials Through Wood, Paper and Fabric". A discussion of this was led by William H. Aiken of the Goodyear Tire and Rubber Company.

In the early evening there was a boatride around Lake Mendota on the University of Wisconsin Campus.

Program of Friday, August 20th

F. E. Brauns of the Institute of Paper Chemistry presented a paper on "The Physical Properties of Lignin" and Mrs. Gunhild Aulin Erdtman of the Forest Products Laboratory of Sweden gave a very interesting lecture on "The Ultra Violet Spectroscopy of Lignin". E. J. Jones of the Institute of Paper Chemistry gave a similar lecture on the "Infra-Red Spectroscopy of Lignin". Although spectroscopy is a relatively new tool used in the research studies of lignin and will require a tremendous amount of future study to obtain reference comparison curves, the method already reveals the aromatic nature of lignin and the presence of carbonyls, aldihydes, etc. Harry F. Lewis led a discussion of these lectures. In this discussion, Dr. Holger Erdtman made an important contribution.

In the afternoon, Harold Tarkow of the Forest Products Laboratory lectured on "Shrinking and Swelling of Wood, Paper Products and Textile Fibers". A discussion of this lecture was led by J. A. Van den Akker of the Institute of Paper Chemistry.

The entire group of lectures were then summarized by Dr. Lewis.

Those present included:

A

Adams, Daniel O.; Aggarwala, J. C.; Aid, J. J.; Aiken, Wm. H.; Alexander, C. H.; Alexander, C. P.; Allard, F. J.; Allison, Henry J., Jr.; Anderson, Bror E.; Andrews, Leslie H.; Aronovsky, S. I.; Arvold, William V., Jr. Ayles, A. W.

B

Baechler, R. H.; Baernstein, Jean; Bainbridge, John; Baird, Parker K.; Becker, H. L.; Betten, Cornelius, Jr.; Betts, Charles Nevin; Bitter, J. L.; Bjorksten, J.; Blake, T. G.; Blume, R. C.; Boggess, W. Doyle; Bradner, D. B.; Brauns, F. E.; Brink, David L.; Broderick, A. E. Brown, Kenton; Browne, Frederick L.; Browning, Wm. C.; Bublitz, Walter J.; Buchanan, M. A.; Busby, H. S.

C

Calkin, John B.; Campbell, W. Boyd; Campbell, W. G.; Chidester, G. H.; Clark, Ira T.; Connor, C. M.; Corey, A. J.; Cornell, John; Crandall, H. C.